THE GARDEN JOURNAL

THE NEW YORK BOTANICAL GARDEN

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DOROTHY EBEL HANSELL
Editor

CALENDAR

Downtown Lecture Series 1960, sponsored by the Volunteer Associates of The New York Botanical Garden: January 7, Dr. William C. Steere—"The Geographical Distribution of Plants, Why They Grow Where They Do"; January 14, Dr. George L. Slate — "Garden Lilies"; January 21, A. Hyatt Mayor—"Renaissance and Baroque Gardens"; and January 28, Dr. Harold Gray—"Gardening Under Glass," in the auditorium of the French Institute Building, 22 East 60th Street, New York, N. Y.

January 12-15, 1960. Seventh Annual Flower Show Symposium, Grace Rainey Rogers Auditorium, Metropolitan Museum of Art, New York, N. Y. On the second day, Louis P. Politi will conduct a horticultural workshop on "Chrysanthemums" and E. J. Alexander one on "Cacti and Succulents." Sponsored by The Federated Garden Clubs of New York State, Inc.

January 15-March 15, 1960. Exhibit "Ecology of the Redwoods" at The New York Botanical Garden, staged on behalf of the Garden by the Conservation, the Horticultural, the National Parks, and the Redwood Grove Committees of the Garden Club of America.

January 16, 1960, 12:30 p.m. Gloxinia Society meeting at The New York Botanical Garden.

January 19, 1960. New York State Arborists' visit to The New York Botanical Garden.

February 6, 1960, 3:30 p.m. Dr. William C. Steere, Director of The New York Botanical Garden, will give an illustrated talk on "Ecology of the Redwoods" as the Free Saturday Afternoon Program in the Lecture Hall of the Museum and Administration Building, in connection with the Garden Club of America's exhibit on "Ecology of the Redwoods."

February 17, 1960, 8:15 p.m. Members' Evening of The New York Botanical Garden at the New York Genealogical and Biographical Society, 122 East 58th Street, New York, N. Y. Dr. Bassett Maguire, Head Curator and Coordinator of Tropical Research of The New York Botanical Garden, will present his superb colored film, "Lost Worlds of Venezuela," with running commentary.

March 4-12, 1960. National Capital Flower and Garden Show, The Armory, Washington, D.C.

March 5-12, 1960. International Flower Show, The Coliseum, New York, N. Y.

March 7-12, 1960. Spring Flower Show, Commercial Museum, Philadelphia, Pa.

March 13-20, 1960. New England Spring Flower Show, Boston, Mass.

April 8, 1960, 2 p.m. Easter Show in the Conservatory opens to members of The New York Botanical Garden.

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CREDIT FOR ILLUSTRATIONS

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Some French Plant Breeders and Their Work in Horticulture

By **André de Vilmorin**

This is based on the talk given by M. de Vilmorin, Vice-President of the Horticultural Society of France, at the Fourteenth Annual American Horticultural Congress, Rochester, New York, October 1959.

IF ONE LOOKS BACK to what is known of horticulture in the past four centuries, one discovers that very often the taste for gardens has nothing to do with the taste for plants. I wager that King Louis XIV could not tell the difference between a pansy and a viola, but he was extremely proud, and rightly, of the garden Le Nôtre made for him at Versailles. This is not only true for Le Nôtre but for the other great geniuses of French landscape architecture: Laborde, François Joseph Belanger, Charles Rivière Dufresny and so on. When one walks in these strikingly beautiful gardens at Versailles, at Vaux, at Chantilly, at St. Cloud or at Méréville one cannot but admire the perfection of design and harmony that is created between the palaces and the gardens surrounding them. The whole would make a perfect frame for flowers; but only a few flowers were used, and they were rather ordinary ones. The love for plants was not born yet, that is to say, a plant did not exist for itself as an individual having its own personality.

Most of us derive great pleasure at seeing a rare or even an unusual plant, and a real collector does not look long at a common plant even if it is beautiful. But in France in those days of the seventeenth and eighteenth centuries trees and shrubs and flowers were used only for their shapes or their colors without concern for their identity. The passion that some Dutch collectors of the seventeenth century had for rare varieties of tulips was not understood by Frenchmen; they found it even laughable. The fashion was rather to decorate gardens and parks with accessories such as grottoes, waterfalls, statues and temples. The only plant collections of which we have records are those of boxwoods or yews in topiary forms—some like musical instruments, some like birds or animals—in gardens at Saint-Ouen, near Paris, that belonged to a priest who was ridiculed for them. If I speak of those times when collectors were unknown in France, it is because I believe that after a period of one hundred and fifty years during which gardeners became plant specialists, we are now reaching the times when few of the real plant specialists will remain and general gardens will become more and more popular.

We must go back to the beginning of the nineteenth century to find a really well-known collection of plants. I refer to the collection of roses brought from all over the world to the garden of La Malmaison for the Empress Josephine, the first wife of Napoleon. But why did this change occur? Because of the new plants that were brought to the country by ship from China, from America, and from the Cape of Good Hope.

André Michaux was one of the first to collect plants in Persia and in America —he even had a nursery near New York City to ship them to France. Michaux died in his round-the-world trip that he undertook to collect more plants. In the last twenty-five years of the eighteenth century, missionaries and travelers were bringing unknown species from everywhere, and these were multiplied and distributed mainly by Jacques Martin Cels and by my ancestor, Philippe Victoire de Vilmorin, and his son, Philippe André. It may appear lacking in modesty to speak about my own family, but we have been scientists, horticulturists, and collectors for seven generations . . . we have been connected in one way or another with plants for the last two centuries. That explains how my great-grandfather was so friendly with Father David, the first one responsible for the horticultural revolution that happened in France one hundred years ago.

From China, Father David brought back new plants by the thousands. He made three trips to different parts of that country. The first one took him to Pekin, then northern Mongolia, especially Ourato, and to Ku-Ku-Nor, west of the Yellow River. The second took him to Tchungking, Tsingliu and Moupin at the border of Thibet where he stayed six months at the risk of his life. He brought from there *Rhododendron moupinense, R. davidii, R. dendrocharis, Primula davidii, Fritillaria davidii,* and *Davidia involucrata* of which he gave one variety to my great-grandfather to disseminate and named it *D. involucrata vilmoriniana.* The third trip took him to the southwest of Pekin in the provinces of Chensi and Liu-Tchuen and to the south until he reached the mountains of Fukien. There he found *Picea armandii* and *Abies davidiana* and the unbelievably rich collection of annuals and perennials that is listed in Franchet's famous book: PLANTAE DAVIDIANAE.

If the name of Father David shines like a first-class star in the sky of French horticulture, he shares this glory with another Frenchman whose work in another direction is certainly not less important. This is Victor Lemoine.

Both were born around 1825 and both started, between 1860 and 1870, to change entirely the materials that were used in horticulture by giving to gardeners and collectors new varieties of which they did not dare to dream. During fifty years Lemoine worked on so many species with such success that it is impossible for me to enumerate all his accomplishments. First, he opened the way to the modern gladiolus by creating successively *G. lemoinei* by crossing *G. gandavensis* by *G. purpureo-auratus.* Then he created *G. nanceianus* by crossing *G. lemoinei* by *G. saundersii* and finally he produced the *primulinus* hybrids.

What Lemoine did with lilacs is not less astonishing. He created many novelties, varieties with single flowers, that were so much ahead of his time that

they are still in use. I cite as examples 'Jacques Callot', 'President Viger', 'Gloire de Lorraine', 'Pasteur', 'Reaumur', 'Paul Thirion', or 'Montgolfier'. Even more than that, by crossing *Syringa oblata* by *S. vulgaris azurea plena*, he developed *S. hyacinthiflora plena*, the first syringa with double flowers. Then he produced *S. lemoinei flora plena* from which actually all the double lilacs have been bred.

In *Philadelphus* he obtained large-flowered varieties like 'Atlas' and the first double variety with large flowers, and then the *dianthiflorus* ones...

Working on deutzias, he was the first to develop hybrids between old varieties and new ones introduced from China by Father Delavay. So he obtained *Deutzia lemoinei*, then *D. gracilis rosea, D. gracilis venusta, D. discolor grandiflora* and *D. gracilis carminea* and finally *stellata* and others that are still unbeaten.

Lemoine was the first to produce double tuberous begonias, and among the new and improved semperflorens or gracilis, he bred some varieties still grown in France.

He improved the montbretias, bouvardias, ceanothus and quite a good many perennials. Among the latter he was the originator of *Heliotropium giganteum* with the big bouquet of flowers, which he obtained by crossing *H. peruvianum* by *H. incanum*. He improved the astilbes by crossing *A. davidii* by *A. lemoinei* and *A. chinensis*. He bred perennial phlox, Japanese anemones, primulas, pyrethrums, and many other interesting flowers.

Let me remind you of what he did on peonies. By crossing *Paeonia sinensis* and *P. wittmanniana*, he created many new and interesting varieties of herbaceous peonies. Then, by crossing *P. delavayi* by *P. moutan*, he got the famous 'La Lorraine,' the first variety with large full flowers of a bright yellow.

Among all the hundreds of varieties that Lemoine obtained, many have disappeared or are kept only for their historical interest. It is the fate of breeders to have their introductions or their breeding work superseded by the work of people using the breeding material they put at the disposition of the new generation. But when we walk in gardens, both in Europe and in America, we see that many of Lemoine's varieties are still grown. Even if all his work were superseded, Lemoine would remain a legendary figure. He has been what every breeder dreams to be, that is to say, the King Midas of horticulture who, instead of changing everything to gold, changed everything he touched into new and more beautiful flowers. Maybe he had the good fortune to live at a period when this was made possible by the introduction of all those species and varieties from far away countries, but more than the good fortune, he had the imagination that allowed him to try everything, even the seemingly impossible, and to hope for something to come out of the Pandora box. His enthusiasm pushed him to try crossings between unrelated species or varieties, and it was his naive faith that allowed him to obtain so much, because he tried so much.

In France many other horticulturists have gained our gratitude:

François Cels, who introduced the lobelia, the lupine, the double philadelphus that Lemoine used for crossing, plants from the Cape of Good Hope such as tritoma, agapanthus, ornithogalum, *Gladiolus blandus, G. cardinalis*, and others. It may be of some interest to learn that it was his gardener, a man by the name of Duval, who invented the method of budding on roots which is today the only method by which millions of roses and fruit trees are propagated.

Soulange Bodin is the one who obtained *Magnolia soulangeana* by crossing *M. yulan* by *M. discolor*. He is said to be the first collector to have had a white tea rose and a yellow tea rose in his garden at Fromont, where he had a collection of over four hundred varieties of roses. He, too, invented the actual technique used in the multiplication of dahlias.

Léon Chénault has a great name in French horticulture. He was selected by my great-uncle for his really unusual ability to keep and multiply plants, and so he was put in charge, in France, of getting, multiplying and distributing all that was sent to us, by Professor Sargent of the Arnold Arboretum, that had been collected by Dr. Fairchild and by E. H. Wilson. Chénault and his son, who is following in his footsteps, introduced in France more than three thousand species and varieties. If I cite his name, though most of the plants introduced were known in America, it is because of its being a very good example of the reciprocation between France and America and of the exchange of plants and breeding material that has been going on for so long.

In French history of roses, there is a well-known name and that is Pernet-Ducher. After having obtained very striking and new varieties in the hybrid teas, such as 'Caroline Testout', 'Abel Chatenay', 'Clos Vougeot', this breeder created a new section of roses, the Pernetiana, by crossing *Rosa lutea flore pleno* by 'Antoine Ducher'. He was the one who brought the yellow color into the hybrid tea and the obtaining of the 'Daily Mail' rose, or 'Ville de Paris', were horticultural events which many at this Congress remember.

Pernet Ducher worked with E. G. Hill, the famous rose hybridizer of Richmond, Indiana, who brought Lemoine's new varieties to America. Here again is an example of cooperation between the two countries.

Another name associated with roses is Meilland. For a hundred years the Meillands have been hybridizing roses, and among the very famous varieties they have produced are two that everyone knows or has in the garden — 'Peace' and 'Happiness'.

From what we have seen we reach the conclusion that breeding is definitely an affair for specialists. It is a 10,000 to one chance of improving a variety if one doesn't know the present and future possibilities of the breeding stock and if one doesn't know what he is aiming at. Even for technicians, every step of the ladder toward improvement is difficult to climb.

In France, as without doubt in most countries, research for novelties is based principally on three techniques or a combination of those techniques. The first is classical breeding, the second is polyploidy, and the third is mutation stimulated by different rays.

Classical hybridization is, of course, the most commonly employed because it can be used for many different purposes. Either one wants to find a new plant by crossing breeding materials one knows well and is certain to get in the segregation what he is looking for. Either he uses this technique to create a certain number of "F_1's" that he can use directly because they have possibility of vegetative multiplication. Or when one is working with pure lines, he may do the crossing to get the "F_1" whose seed will be directly sown. Or it may be used to develop, for instance, resistance to some disease or rust by crossing the actual known variety by another variety having such resistance and back crossing as long as required to get the named variety with this new character.

Polyploidy is, in a way, the most attractive because it is the safest of all, but it needs highly specialized technicians because of the great number of traps that are open under the feet of breeders. I refer to the frequency of chimeras or sterility or difficulties of reproduction for plants that multiply by the roots. More than that, most of the things obtained through this process are monsters without any horticultural interest.

Such is also the case for many of the results of artificial mutation. In fact, this method is rather deceiving, mainly because breeders do not know how to utilize it in the direction they want. In a way, it is still a matter of luck that a ray will hit a gene, or a part of a gene, at the right period of multiplication of the cell . . . There have been so very few interesting results that many of us would have given up using artificial mutation, if we were not pushed by a kind of costly curiosity to see where the most modern of the methods will lead us . . .

All these methods have this in common, that it is impossible to foresee exactly the result of the work even when statistical preparation and knowledge of the parents allow us to reduce the number of bad risks. And then,

after getting new plants, the experimentation poses new moral and financial problems. The finding of new plants does not proceed without an enormous waste of technique and money, and it is certain that most of the private breeders would today have ended their work if the protection of the breeders' right or patents had not been generally accepted and did not bring part of the money they need to continue with their research. The efforts of Francis Meilland for plant patents in Europe helped greatly a good many plant breeders.

Now that I have spoken about the past and the present, I shall tell in a few words how I see the future in France.

I believe in research for novelties, because novelties possess glamour and are a very powerful stimulus to interest in horticulture...

I believe that the time will come when the importance of botanical gardens will be so great, partly because of fewer collectors and the disappearance of many collections, that almost every city will have to have a collection of all the important botanical materials. It will be for students, it will be for the general instruction of the public, and it will be, too, for future breeders to help them with the unusual plants they need. What should these future breeders try to reach in their work? In my opinion, they will have to disregard the slight differences of size or color, of shape of the flowers or this and that, and breed plants that will please the public either for indoor or outdoor use. This means healthy plants, long-flowering plants, nicely colored plants, disease-resistant, frost-resistant plants. . . . we regret that we don't see enough cut flowers in houses. But when we have roses that, grown by serious professional growers, will last two or three weeks in vases, one may predict that roses will be used ten or twenty times more than they are today. This is, in fact, what happened in France where the popularity of small chrysanthemums as cut flowers soared very high just because they last long in apartments. The number of plants for which this improvement is desirable seems to me enormous, for instance, dahlias, anthemis, delphiniums, lupines, peonies . . . the idea that people will use more flowers if they die more quickly is one of those absurdities too absurd to be discussed.

Outdoor plants, I believe, will be mainly used: first, in the little gardens with no professional help and, second, in parks or public gardens, factory gardens, school and university gardens. We shall return to a certain extent to where we stood when we had those big gardens of the seventeenth and eighteenth centuries in France. In these future gardens landscaping will be most important and will create perfect settings for the flowers that will be used in masses but chosen mainly for the general qualities of the plants rather than their rarity.

If I foresee rightly the same plants will be used in these two categories of gardens, because people will go to the public parks to get ideas about plants and colors, and, not being technicians themselves, they will have to be shown all the plants they can use, to be successful in the making of their own gardens.

That's why, without pretending that these public gardens will be gardens of Eden, I am convinced that breeders will have a very important part to play in the orientation of the social life. A French writer wrote a few years ago: "One does not understand anything of modern life, if one does not admit first that it is a universal conspiracy against every kind of spiritual life." I admit it is more so in Europe than it is in the United States, but it is a danger everywhere. By

(Continued on page 29)

Mrs. Roy Arthur Hunt is standing in the gate to the garden of her home in Pittsburgh, Pa. (Frontispiece in Volume 1, reviewed here.)

CATALOGUE OF BOTANICAL BOOKS IN THE COLLECTION OF RACHEL MCMASTERS MILLER HUNT. Volume I. Printed Books 1477-1700. With several manuscripts of the 12th, 15th, 16th & 17th Centuries. lxxxiv; 517 pages. Compiled by Jane Quinby. The Hunt Botanical Library, Pittsburgh, Pennsylvania. 1958. Distributed by The L. H. Bailey Hortorium, Cornell University.

A REVIEW

By William Campbell Steere

Dr. Steere is the Director of The New York Botanical Garden.

FOR MANY YEARS, now, the Rachel McMasters Miller Hunt Botanical Library has been to all botanists and students of botany, both amateur and professional, an almost legendary treasurehouse of books about plants—books that stand as botanical landmarks, magnificently illustrated books, and books so rare as not to exist elsewhere in North America. Although long familiar with the legend of this wonderful collection, I became acquainted with part of it, at first hand, just ten years ago, when Mrs. Hunt most generously loaned a selection of fifty-five books for exhibition in the Clements Library at the University of Michigan, on the occasion of the Summer Field Meeting of the Botanical Society of America in Ann Arbor. In Bulletin LVII of the Clements Library, "Fifty-five Rare Books from the Botanical Library of Mrs. Roy Arthur Hunt" (August, 1949), a handsome brochure prepared to accompany this breath-taking exhibition, Professor Harley H. Bartlett described the books in bibliographer's terms and gave pertinent information about their origins and their authors. Because of my background of active interest in the Hunt Library, I have been all the more impressed with the magnificent volume reviewed here, the first of a series of three.

In a charmingly modest preface, Mrs. Hunt outlines much too briefly the development of her interest in botanical books and her activities in collecting them. Her circle of friends among botanists, bibliographers, and scholars in general is astonishingly wide, as reflected by her special section of acknowledgments to so many different individuals. Although Mrs. Hunt does not give herself sufficient credit in her preface, or elsewhere, her great accomplishment in bringing together an almost incredible collection of books, her consuming interest in botany, botanical bibliography, and botanists, and her active participation in the preparation of this volume shine forth from every page.

The "Introduction" consists of four illuminating essays. The first, "Botany from 840 to 1700," is a thoughtful and scholarly treatment by Dr. Harold William Rickett, Bibliographer of The New York Botanical Garden. Dr. Rickett has skillfully woven together the historical trends and the streams of botanical activity that eventually brought about the birth of modern botany, illustrating the progressive steps with the most appropriate books. His annotated list of nine general references is recommended to those who wish to read further. In a very brief essay, "Medical Aspects of Early Botanical Work," John Farquhar Fulton, M.D., Sterling Professor of the History of Medicine at Yale University, emphasizes the importance of the medicinal uses of plants — and of the herbals that specified these uses—on the development of modern botany. Dr. Paul Bigelow Sears, Chairman of the Conservation Program at Yale, in a thought-provoking essay, "The Dawntime of Modern Husbandry," brings his interests of exceptional breadth to bear on the effects upon agriculture of wars, of social systems and their change, of racial and national techniques and practices, of feudalism, of the vast land holdings of religious groups, and of social and historical forces. Finally, Professor Wilfrid Blunt, A.R.C.A., of Eton College, Windsor, analyses "The Illustration of Early Botanical Works" with scholarship and authority, and also with the sensitive perception of an artist. The twenty-four collotype plates at the end of the volume may be studied with benefit in conjunction with the reading of this essay.

A separate "Bibliographic Survey," "Printing in the 15th and 16th Centuries as Represented in the Hunt Collection; with a Note on the 17th Century," has been contributed by Dr. Margaret Bingham Stillwell, Librarian Emerita of the Annmary Brown Memorial in Providence and Professor Emerita of Bibliography, Brown University. She has brought together in a highly readable manner much fascinating information on history and botany as they relate to the printing of early books. This chapter is a "must" for anyone interested in the early beginnings of botany, as too few of us fully realize the very real influences of economic, political, and religious upheavals at home and of imperialistic and military ventures abroad on the velocity and direction of today's botany. The account of organized strikes by printers for higher wages and better conditions, strikes that began in 1539 and occasionally stopped the production of botanical books during the next thirty years, may remind the reader somewhat uncomfortably of much more recent events!

The Catalogue itself, the main body of the book (517 pages), is introduced by an "Explanation of Catalogue Method" by Jane Quinby (compiler of this volume and Librarian of the Hunt Collection), as well as by a list of "Earliest Authors and Anonymous Works from Hippocrates to the Invention of Printing." The 402 entries in the Catalogue, beginning with Macer's FLORIDUS DE VIRIBUS HERBARUM CARMEN, *ca.* 1150, and ending with Nourse's CAMPANIA FOELIX, 1700, are arranged in a strictly chronological order. Reflecting much careful research, the description of each entry furnishes the following essential information: 1) date; 2) author's name, dates, and brief biographic material; 3) generic title; editor or translator;

(Continued on page 7)

DOUBLE GLOXINIAS NEW AND OLD

By Paul Arnold

Mr. Arnold is registrar for the American Gesneria Society and international registrar for the plant family *Gesneriaceae* (excluding *Saintpaulia*). He specializes in growing gesneriads in Binghamton, New York.

ONE OF THE popular home garden magazines accepted for publication in its January 1959 issue the advertisement of a South Carolina nursery firm which proclaimed *"the first and only Giant Double Gloxinias."* The attention of the editor of that periodical was called immediately to the fact that his own pages, ten months earlier, had carried a contradictory advertisement by a New York State mail-order concern claiming they had *"The world's first and only Double Flowering Gloxinias."*

The editor, unabashed concerning his part in this deception, made no effort to correct either the contradictory priority claims or the fundamental error made by both advertisers. Neither firm, as a matter of fact, had the *first* or the *only* double-flowering gloxinias to be offered to the public.

Exaggerated advertising claims are traditional in horticulture. The experienced reader soon learns, by expensive trial and error, to translate "earliest" into "fairly early," to scale down "everblooming" to "blooms over a long period of time," and to make proper allowance for over-enthusiastic inaccuracies such as "new" for a plant like *Aeschynanthus pulcher*, which was described and named in 1837, grown extensively in western Europe before the turn of the century, and only recently offered for sale in the United States. The Congressional Committee on Legislative Oversight has not seen fit to question the *never never or hardly ever land* of horticultural advertising, and perhaps the tradition of exaggeration is too well known to plant and seed buyers to require such inquiry in the public interest.

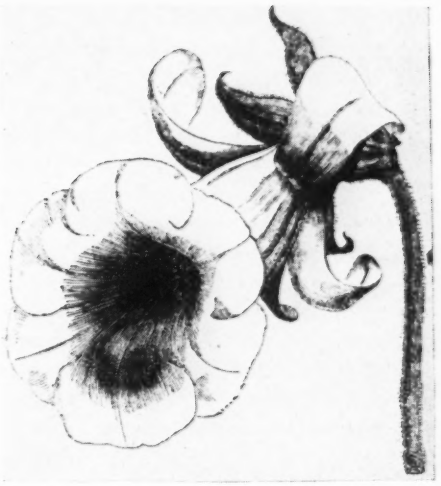
Gloxinia growers recently have shown a definite but rather wary interest in the current advertising. This wariness may, perhaps, not be due entirely to the remembrance of previous encounters between horticultural innocence and commercial fiction. Some growers had never before heard of double-flowering gloxinias, just as the advertisers had hoped. In other cases, the growers had encountered petalody in their own plants from time to time. They chose to "rogue" out such irregularities from their cultures rather than to develop them into more fully double flowers by selective breeding. Other gloxinia lovers simply think the open chalice of a beautiful gloxinia is a thing of surpassing glory to which additional petalage would be a detraction. Still others, noting the current interest in such novelties, and challenged by the statements that such flowers are a tremendous breeding accomplishment, went to work and produced double-flowering gloxinias.

THE PULLEN DOUBLE GLOXINIAS

The double gloxinias, offered in March 1958 by one nursery and in January 1959 by another nursery, came from the same wholesale market grower, Col. Joe Pullen of Houma, Louisiana. The Pullen Double Gloxinias were first offered for sale in the United States in the autumn of 1957 by the Vaughan Seed Company of Chicago and New York. This offering appeared in their autumn 1957 wholesale catalog or "Book for Florists" and listed plants of two types: Gorgeous Double Red and Gorgeous Double Red and White.

The following spring, in the March 13, 1958 issue of the weekly FLORISTS' REVIEW, a Vaughan advertisement offered these same plants under the names Super Double Red and Super Double Red and White. The additional information was given that they had forty-five to fifty petals to a flower. That claim for petal count, however, has not been repeated in succeeding Vaughan advertisements for obvious reasons. The designation Super Double, however, has been continued as a replacement for the term Gorgeous Double.

Vaughan's Seed listed Double Dark Blue in the spring of 1959 and changed it to Double Blue in their autumn 1959 list. The Double Red and White was not offered after the autumn 1958 occurrence. Only two types, Double Red and Double Blue, were shown in the autumn 1959 list, where there also appeared, for the first time, a statement that they produce "approximately sixty-five to seventy percent true doubles."



The beginning of doubleness in a gloxinia flower was reported as early as 1845, when this picture was taken in England. The Floral Committee of the Royal Horticultural Society viewed a number of such flowers without enthusiasm.

THE ORIGIN OF PULLEN DOUBLE GLOXINIAS

Colonel Pullen has been described as a hybridizer, and the first man to produce double-flowering gloxinias. However, individuals who have visited his nursery at Houma, Louisiana, report that Col. Pullen very freely discusses the origin of the plants he grows, states that he imports the seed from Europe and has an exclusive arrangement to do so.

Nevertheless, the idea that double gloxinias are of recent American origin is growing as a legend, fostered by florists' sales promotion. An example is the Geo. W. Park Seed Co. "Flower Book Planting Time Supplement," a publication which bore only the date 1958, but it was mailed about the first of March, according to Geo. B. Park. In this catalog is found the following:

> *Giant Double Flowering Gloxinias*
> We proudly present this Horticultural Triumph while it is almost too new to be true . . . . Mr. Joe Pullen of Houma, La., has performed a near miracle, a hybridizing feat here-to-fore thought to be impossible. He has discovered the secret and produced the first and only Giant Double Gloxinias known to Floriculture.

Disappointed that the plants which they received from Col. Pullen were not one hundred percent double, the Park Seed Co. selected some of the better double-flowering plants and propagated them vegetatively. Such guaranteed one hundred percent double gloxinias were offered by Park early in 1959 under two cultivar names: 'Jack O'Diamonds' and 'Monte Cristo'. The first one was described as a light scarlet flower with white edge, and 'Monte Cristo' was pictured as an all-red flower. In November 1959 a third cultivar, 'Blue Chip', was offered in Park's national advertising which described it as deep royal blue in color. This name was changed to the plural form 'Blue Chips' in Park's December 1959 advertising, and a fourth cultivar name was added, 'Royal Flush', described as blue and white.

Efforts to learn who really did develop the seed lines, that produced and currently maintain the Pullen Double Gloxinia strains have not been well rewarded. Letters addressed to Col. Pullen have gone unanswered. The firm in Zürich that supplies the seed to Mr. Pullen was contacted. It feels that secrecy is required to protect from exploitation by rival seed houses its endeavors over the years to establish and maintain a source of supply for double gloxinia seed. This firm points out that it has found it difficult to locate, in Switzerland and in other countries, growers who not only could produce the double gloxinia seed but who would produce it consistently and dependably in the required quantity.

Consistency and Persistence of Doubling

The dependability of the Pullen Strain of Double Gloxinias with respect to its consistency in producing double flowers has been a matter of interest to growers. Geo. W. Park, as noted above, dropped the seedlings entirely from their catalog to avoid disappointing their customers. Instead, they offer only the more expensive, vegetatively produced plants to insure one hundred percent double flowers.

The only grower known to me who has received seed from Col. Pullen has found less than thirty percent double flowers in his cultures. Pullen Double Gloxinia plants grown at Cornell University produced about fifty percent double flowers. Although Vaughan's Seed Company advertised sixty-five to seventy-five percent double-flowering plants, R. Milton Carlton of that firm reported that some lots of Pullen Double Gloxinia plants which they flowered "have produced as high as eighty percent doubles" in their test center at Wheaton, Illinois. The source from which the seed was obtained in Switzerland states, "Only approximately forty percent are really double flowering."

Some alert growers, including Col. Pullen, have noted the influence of cultural practices on the production of double flowers. It appears that an excess of nutrient is more effective than near-starvation in producing double gloxinia flowers. If particular minerals in the food supply of the plants have an influence on double flower production, one way or another, there does not appear to have been any systematic determination of such effects and no reports of such findings in the horticultural literature have been noted.

Experienced growers have noticed that double-flowering tendencies have appeared from time to time in their gloxinia plants, only to disappear and seldom reappear when the same tuber is brought back into flower the second year. A few individuals who purchased double gloxinia plants from florists have complained later that the tubers produced only sin-

A silver medal as well as first prize for an undisseminated sport or hybrid was won at the 195 New York International Flower Show b one of these Thompson Double Gloxinias.

gle flowers when restarted from dormancy. All these happenings seem to be manifestations of the natural variability of the *Gesneriaceae*, a well-documented characteristic which is the delight as well as the despair of the growing legion of gesneriad fanciers.

Double Gloxinias of Former Years

Before the surprise appearance in 1845 of gloxinia Fyfiana, the first one to have upright flowers, all gloxinias were of the nodding type. It is not surprising, therefore, that the earliest account of a double gloxinia deals with one of the so-called "slipper" or drooping varieties. Writing about it in the Journal of Horticulture, Cottage Gardener, and Country Gentleman issue of February 2, 1864, the editors, George W. Johnson and Robert Hogg, made an observation which is being echoed more or less by gloxinia growers today, as they note the fuss that is being made about double-flowering types.

> To Correspondents. Double Gloxinias. (Rev. A.F.).— we know of no reason why gloxinia flowers should not be obtained double, for other campanulate corollas are so transformed. The accompanying is the commencement of such a change, and is the portrait of one of several similar flowers exhibited before the Floral Committee of the Royal Horticultural Society. We agree with the Committee in thinking it no improvement to the flower.

A decade later, Thomas Veitch and Sons of Chelsea, in London, apparently marketed two cultivars of upright flowering double gloxinias, sometime before 1877. In his catalog for 1877, the Belgian nurseryman, Louis de Smet of Ledeberg-lez-Gand, listed 'John Gray' and 'Lady Cremorne', describing them as "double corolla."

Two years later, Louis Van Houtte in Belgium and Anthony Roozen & Sons in Overveen, near Haarlem, Holland, listed these same double-flowered gloxinia cultivars in their respective catalogs. Van Houtte's 1879 price list attributed both cultivars to Veitch and identified them as upright flowers. In describing 'Lady Cremorne', he speaks of "a new type of flower adorned with an elegant, lively rosy and white tucker inside of throat, very lively dark rose." Apparently no other nurserymen took up these novelties, either in England or on the continent, and they soon disappeared from catalogs.

All American Double Gloxinias

Both upright (Fyfiana) and nodding (Maxima type) double gloxinias were shown at the 1959 New York International Flower Show. At the 1958 show there had been two or three entries of Pullen Strain Double Gloxinias. The 1959 entries were noteworthy not only for the fact that both upright and nodding flowers were shown, but also because these double gloxinia plants had been bred in the United States by Bruce A. Thompson of Philadelphia.

The Thompson Double Gloxinia flowers are generally red or rose-colored. Some have a red limb and white corolla tube. All are completely double flowers of the "hose in hose" type that is familiar in campanulas. A Thompson Double Gloxinia flower, red with white tube, which I examined, had a six-part calyx, a six-lobed outer corolla, and a seven-part inner corolla. The outer corolla was unadorned, but the inner tube had three partly developed petals on its outer surface and four similar "tuckers" on the inside; all of them in different stages of under-development. This flower lacked a perfect style, but it had a multiplied organ composed of six fused shafts, one of them showing petal color at its tip. There were in the disk five glands of normal form plus one broad three-lobed gland of unusual form.

Mr. Thompson also has produced a double gloxinia with deep purple limb and tube of paler color. A flower of this type showed two complete corolla tubes of six lobes each, a six-parted calyx, and six glands in the disk. In addition to an apparently perfect style and stigma, there was a second "style" composed of five or six columns fused together and ending in imperfect stigmas. None of the Thompson Double Gloxinia flowers, of course, have any filaments; those organs have been developed into petalage.

Mr. Thompson, who grows his plants in the basement of an apartment building, under fluorescent lights, started with a Pullen Double Gloxinia plant. He fertilized the double flower with pollen from a Thompson Hybrid Gloxinia selected from one of the distinctive strains he had successfully developed during the past several years. Mr. Thompson is a hobbyist grower who does not sell plants or seed, but there is a possibility that one of the house plant nurseries dealing in gesneriads may offer the Thompson Double Gloxinias for public sale in the near future.

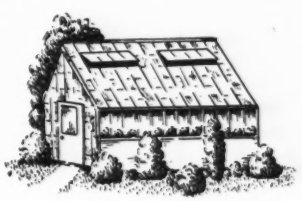
In Warsaw, New York, Henry Ten Hagen, the African violet grower, has produced a strain of double-flowering gloxinias by fertilizing a Pullen Double Gloxinia having red and white flowers by means of pollen from a blue-colored Buell Hybrid Gloxinia. People who have seen the resulting population consider them attractive. Steps are being taken to build up a sufficient stock of the Ten Hagen Double Gloxinias so that they can be offered commercially.

A REVIEW (from page 4)

place, printer, date; number of volumes; 4) title-page; 5) collation; 6) description of the Hunt Library copy; 7) published references and location of other copies; and 8) explanatory notes. Needless to say, this Catalogue is truly a mine of bibliographic information for all time.

The "Appendix" describes fifty-six important early books that have appeared as reprints or transcripts or in facsimile form since 1700. Volume I ends with an extensive bibliography of reference books; twenty-four well-selected collotype plates of illustrations and title-pages arranged in chronological order and related by number to the corresponding entry in the Catalogue; and an unusually comprehensive Index.

This reviewer would be committing a crime of omission if he did not mention the beautiful appearance of the book itself. The composition and presswork by The Anthoensen Press, on excellent, specially watermarked paper, is outstanding for its aesthetic quality and its accuracy; the binding is not only handsome but also sufficiently sturdy even for a reference book that must withstand as much use as this one will obviously receive.



Wallacea insignis Spruce ex B. & H. is a common shrub with pink-eyed white flowers along both Caño Temi and Caño Pimichín. The generic name is a token of Richard Spruce's friendship.

A Historic Portage

***By* J. J. Wurdack**

Dr. Wurdack is Associate Curator of The New York Botanical Garden.

A Description of Javita

'Tis where the streams divide, to swell the floods
Of the two mighty rivers of our globe;
Where gushing brooklets in their narrow beds
Lie hid, o'ershadow'd by th' eternal woods
And trickle onwards,—these to increase the wave
Of turbid Orinooko; those, by a longer course
In the Black River's isle-strewn bed, flow down
To mighty Amazon, the river-king,
And, mingled with his all-engulfing stream,
Go to do battle with proud Ocean's self
And drive him back even from his own domain

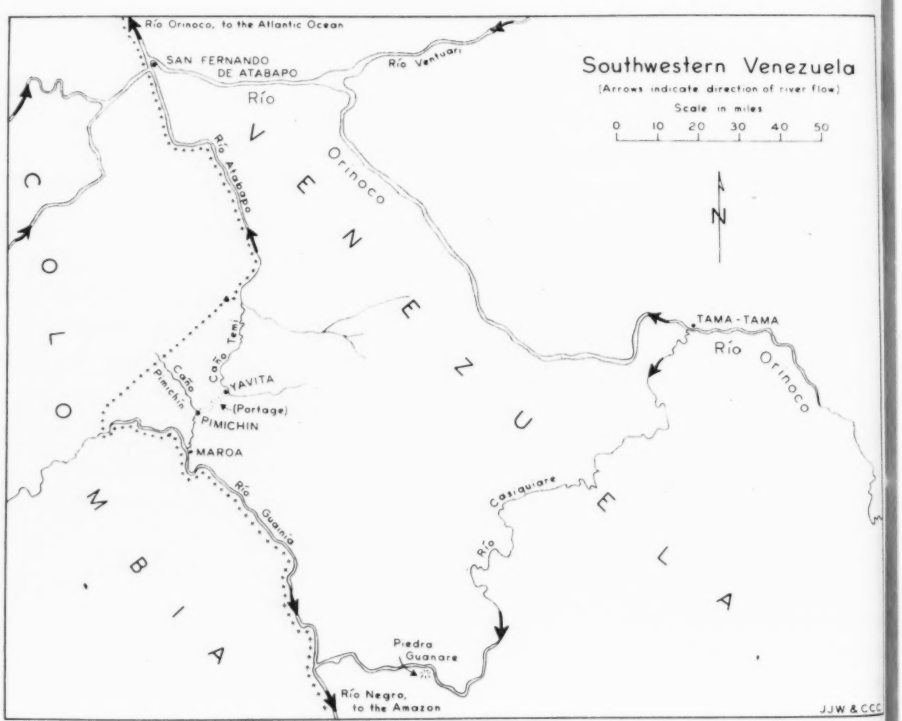
Alfred Russell Wallace

Last year was the centenary both of the death of Alexander von Humboldt and of Darwin's and Wallace's joint publication of a theory of evolution by natural selection. Symposia were held in various parts of the world in observance of these anniversaries. For Humboldt, Wallace, and other pioneer naturalists, one common path in their tropical travels was the portage between the Orinoco and Río Negro drainages in southwestern Venezuela. In their travel writings, both Humboldt and Wallace dwelt at length on their experiences in this region, and undoubtedly their ideas on the tropics were strongly influenced by their stays on the height-of-land.

The Orinoco River describes a gigantic arc of some three hundred and fifty river miles between Tama-Tama and the mouth of the Meta River. Because of the reversal of the Orinoco's course, the all-water trip from San Fernando de Atabapo to the Río Negro via the Río Casiquiare (about four hundred and twenty-five river miles) involves twice as much time as the Río Atabapo —Yavita to Pimichín portage — Río Guainía route (about two hundred miles). Between Caño Temi and Caño Pimichín, the height-of-land is only eleven miles wide, the terrain flat. Indeed Humboldt proposed to King Charles IV of Spain the building of a canal between the drainages to facilitate development of the upper Orinoco–Río Negro area.

For the last one hundred and sixty-four years, the approach from the Orinoco has been the Río Atabapo and its affluent, Caño Temi, to the insignificant port of Yavita. From the Guainía, the sinuous course of Caño Pimichín is followed from just above Maroa to the landing at Pimichín. Both approaches are through flat land with scrub forest and savannas, which are inundated during the rainy season. Inexplicably the entire area is considerably cooler and rainier than the adjacent Orinoco-Casiquiare region. The walk across the portage is predominantly through high rainforest.

Apart from the saving of time, in daily ease of living the portage route has the great advantage of being free from the biting blackflies which becloud the upper Orinoco and Casiquiare Rivers. Thus the short cut immediately became popular among the Portuguese who had been across the divide about 1755. During the middle of the eighteenth century, both Spain and Portugal

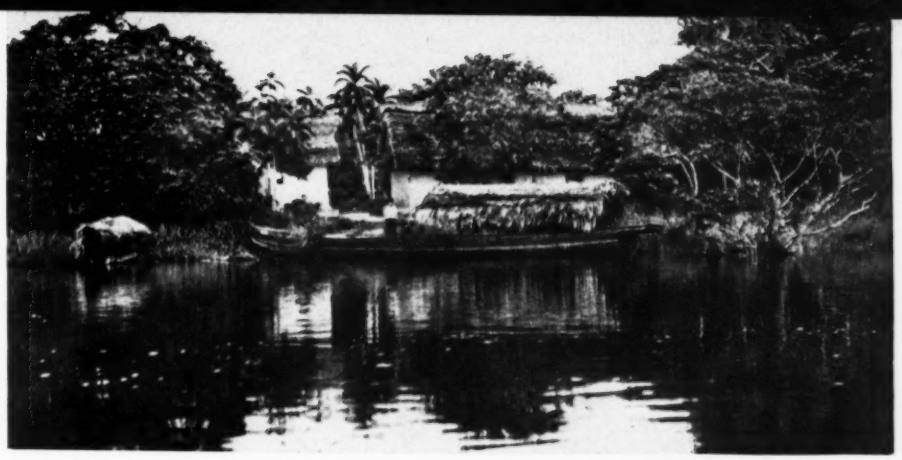


were attempting the consolidation of their respective claims to the Alto Orinoco. Yavita, an Indian chief from the Río Caquetá, came to Caño Temi about this time, ostensibly to propagandize for the Portuguese territorial and spiritual claims, but actually (according to Humboldt) to collect slaves. After being captured by the Spanish conquistador Solano, he was converted to the Spanish cause and the town named for him was established in 1756. The old chief was still alive when Humboldt and Bonpland arrived in Yavita on May 1, 1800; the portage road had been constructed only five years before.

At the time of Humboldt's arrival from San Fernando de Atabapo, Yavita had a Spanish monk in residence among one hundred and sixty Indians. (The 1959 population of Yavita was about thirty, including an outpost of the Venezuelan Guardia Nacional.) The two naturalists remained there several days while their dugout was rollered across to Pimichín; they then proceeded downstream to the Río Guainía on May 8. A welter of impressions and observations were recorded by Humboldt; at Yavita was first seen *cupana*, the source of a popular tropical drink; the botanical source of *curare* was first collected at Pimichín; *jigua*, the edible fruit of a *Caryocar*, was sampled at Pimichín; the abundance and lethal effects of the *mapanare* (fer de lance) made a deep impression on the "last of the universal men." The eighty-five curves of Caño Pimichín Humboldt rated second only to the windings of the Chagres River. While in the portage's high forest, the envy of a tropical plant collector was well expressed by Humboldt: "What we could gather appeared to us of little interest compared to what we could not reach."

Wallace's long approach to Yavita was from the Amazon and Río Negro. He arrived at Pimichín on February 1, 1851, and at Yavita on February 18. Here he remained collecting specimens (chiefly insects) until March 31. Like Humboldt, Wallace's details of a black jaguar, fish poisons, *mapanares*, and *chiquichique* are an indicative record of the shaping of a great mind. The concrete evidence of his sojourn survives only in his writings. The ship on which he and his large collections were

(Continued on page 13)



Yavita today is even smaller than in Humboldt's time.

Chiquichique palm fiber (from *Leopoldinia piassaba* Wallace ex Archer) is still an important natural product of the Guainía-Atabapo area, as it was in Wallace's time. It is exported to the United States and Europe for brooms and whisk-brooms.

The high forest along the portage is very rich in plant species.

PALAEOBOTANY
at The New York Botanical Garden

By **Herman F. Becker**

Dr. Becker is Visiting Research Associate at The New York Botanical Garden and, under a grant from the National Science Foundation, is continuing his research on the Tertiary Ruby flora of southwestern Montana.

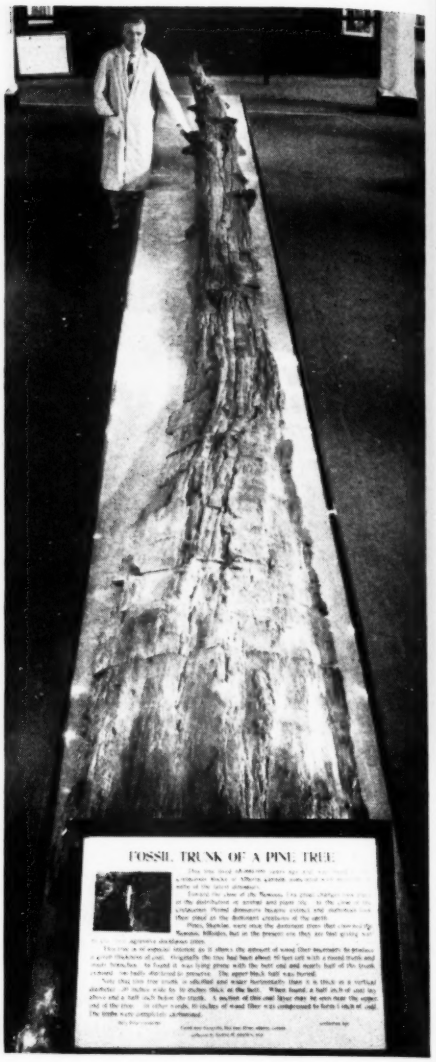
PALAEOBOTANY, in recent years, has finally outgrown its adolescence as evidenced by the ever-increasing number of professional publications, attendance at botanical and geological meetings, the addition of courses, and the concurrent emphasis on streamlined exhibits in the various universities and museums of this country.

The New York Botanical Garden is fortunate to possess as a basic collection one of the finest and most diversified accumulation of classical fossil material. Much of this wealth was assembled and published under the able curatorship of the late Dr. Arthur Hollick. Unfortunately, this material has lain dormant for the past twenty-five years and was permitted to accumulate dust in relative oblivion.

A generous research grant from the National Science Foundation now permits a revitalization of "fossil" interest at the Garden as well as my own continued investigations of the Tertiary Ruby flora from southwestern Montana. Existing collections in the Botanical Garden museum are to be made available for study, loan or exchange, and displays will be modernized and expanded to suit educational requirements. Before such an ambitious program can be realized, however, a hitherto non-existing specimen record must be created. When one considers the need for an estimated ten thousand typewritten index cards, the implications regarding time and effort for such an undertaking become self-evident.

Judging by recent trends, macro-palaeobotany, the study of fossil leaf and floral structures, is rated second to its latest offspring, palynology, the science of pollen study. From an economic point of view one may consider palynology worth more in dollar returns, since this study may be successfully applied to certain phases in oil geology. As a contribution to basic science, however, to the evolution of flowering plants, to the knowledge of leaf shape and variability, and to say nothing of aesthetic aspects, macro-palaeobotany elicits a considerably greater botanical value from its study and result.

The inherent fascination of exploring unknown fossil floras, adding to the range of described as well as to the knowledge of new species, and of presenting their botanical, ecological, and evolutionary implications to the interested student and reader, caused me to delve into floral secrets of the Tertiary Ruby basin in southwestern Montana. Ever since my discovery of this assemblage in 1947, new specimens and species were added during six successful seasons in the field. Last September this area, on the fringe of the West-Yellowstone-Madison-River region, became notorious because of the disastrous earthquake. Such phenomena undoubtedly occurred many times during the geologic past, for the collecting ground is traversed by countless faults and shows other old and recent evidence of volcanic activity. The fossil sites yield an apparently inexhaustible wealth of plant and insect remains together with fishes, aquatic larvae, snails, feathers, and even an entire bird. Within two miles on the same pediment, bones of Miocene camels and horses were found. This diversified flora and insect fauna ranges from the Paleocene through the



The upper, forty-foot portion of a silicified pine trunk which was more than twice as long. This Cretaceous tree, at least seventy-million years old, was donated by the American Museum of Natural History.

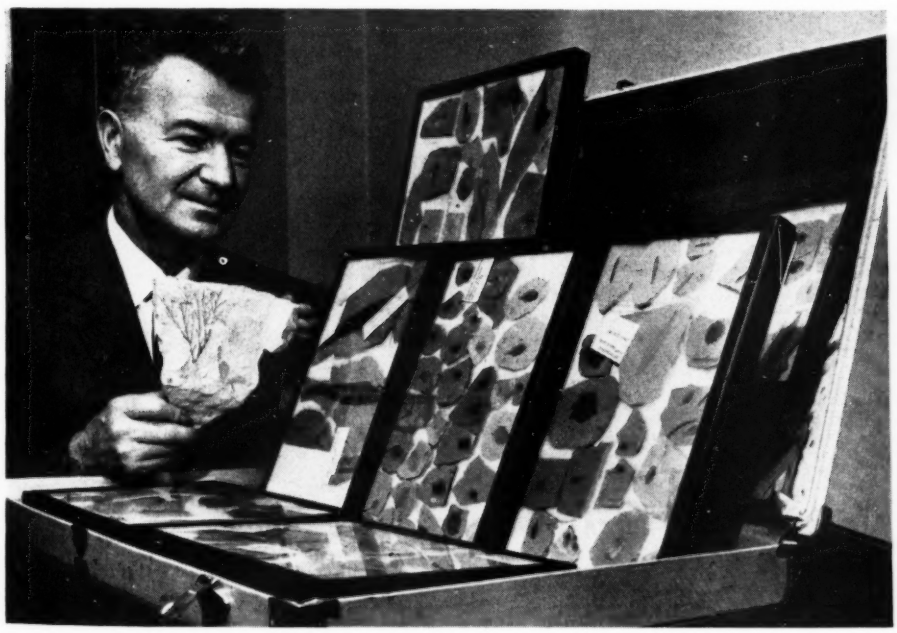
RUBY FLORA FOSSILS SW MONTANA COLLECTED BY H.F. BECKER
RUBY MORMON CREEK FLORA
RUBY YORK RANCH FLORA
RUBY PAPER SHALE FLORA

The author's 1959 collection of approximately five thousand specimens of Tertiary fossils from the Ruby flora in southwestern Montana, representing about two hundred species of plants, insects and fishes.

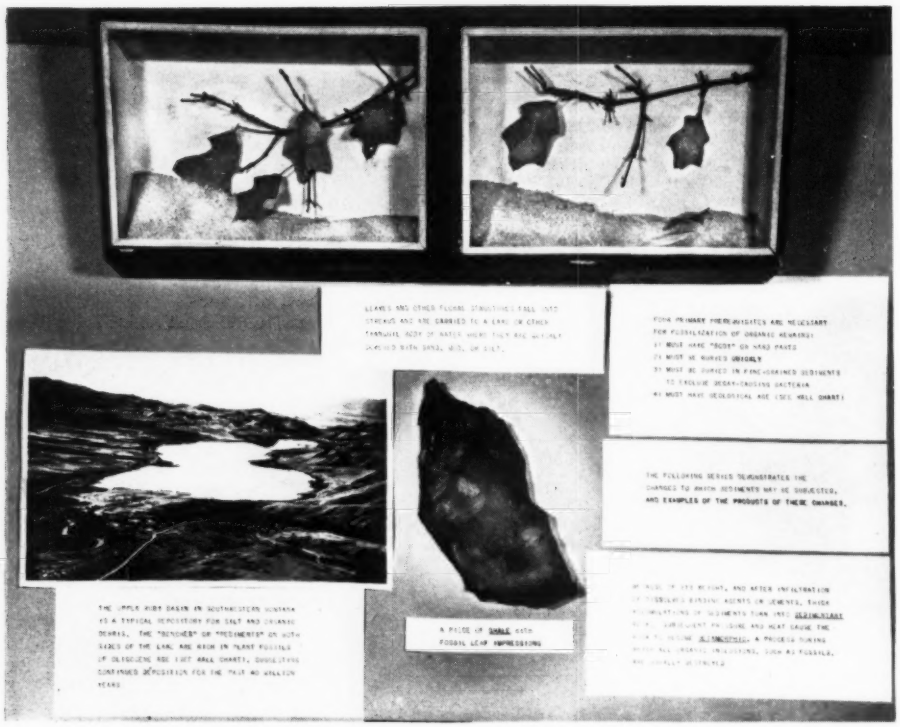
Aerial view of the northern portion of the upper Ruby basin in southwestern Montana with fossil plant localities on the beaches in the left foreground.

Miocene, but specimens of the Oligocene age are most abundant. Floristically the paper shale phase of the assemblage is very similar to that of the Florissant flora in Colorado with which it has a forty-two percent identity. In addition, the occurrence of many species extends the range of ancient known plants, connecting the Florissant area via the Ruby region with certain fossil floras in Oregon and other western localities, thus uniting them in a common botanical province.

A typical day in the field during June to August is largely determined by the climatic factor. An average annual rainfall of from twelve to fourteen inches, with most of it during the winter and spring, results in semi-desert conditions during the summer. In the draws and drywashes on the pediments or benches that contain the fossil sites, temperatures often fluctuate between 90° and 120° in the sun, but the relative humidity is low. Except under an occasional solitary juniper tree shade is lacking, and in the usual absence of a breeze, reflection from the light-colored shale and sand increases heat and glare. Thus it becomes imperative to work the sites from sunrise to noon, and perhaps again during the late afternoon hours. Excepting the everpresent, noisy magpies and the soaring red-tailed hawks, life on the benches is restricted to antelopes, rabbits, mice, rattlesnakes, and insects. Greasewood, sagebrush, opuntias, bitter-roots, and a host of desert plants, including sparse grasses, thrive under these conditions. Cattlemen complain that it takes twenty-five thousand acres of this type of range land to feed one thousand cattle. Permanent streams are few and far between, and drinking water must be brought in from a distant ranch. Cataloguing, trimming, wrapping, and packing of specimens, as well as more intellectual pursuits, are relegated to the compara-



The author is demonstrating the packing and means of transportation of some paper-thin fossil shales, which are placed in cotton-lined Riker mounts.

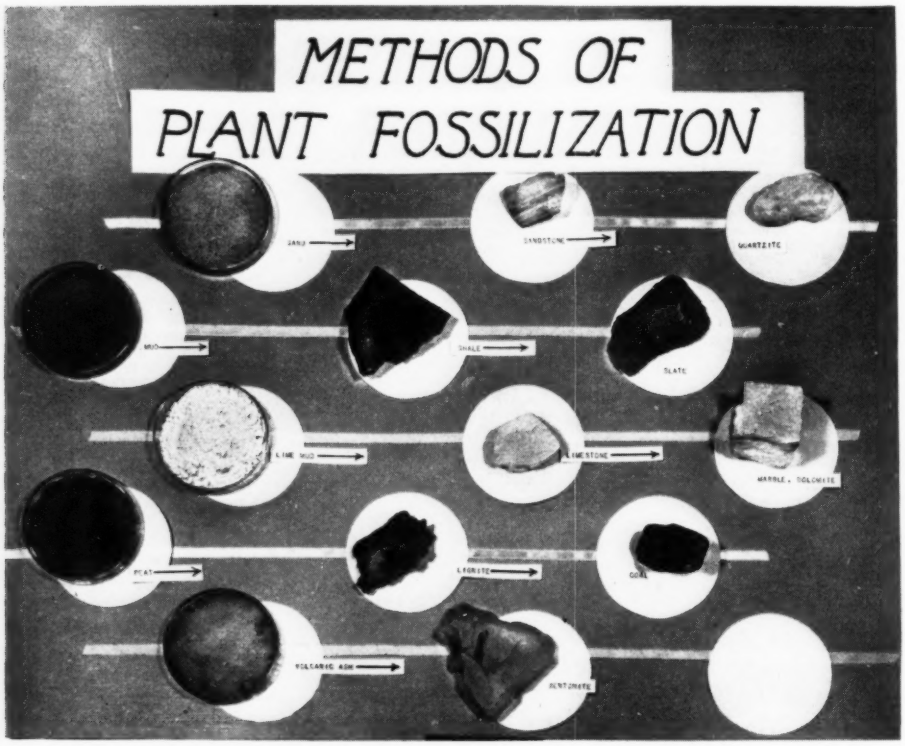


New, permanent exhibit demonstrating methods of fossilization—

Above. Burial of leaves and factors required in fossilization.

Below. Types of sediments and rocks which favor preservation of fossils; the series is one of progressive alteration.

Top, page 13. Rocks which never contain fossils, and the preservation of organic debris, including pollen, as constituents of peat and lignite.



tive coolness of the evening hours. Night temperatures, ranging from 40° to 60°, with an occasional dip to 28°, offer welcome relief, sometimes tempered, however, by an invasion of mosquitoes from the not too distant Ruby River bottomlands.

All fossil sites are located within three square miles on the benches abutting on the Ruby range. It is fortunate that they occur near the surface or on the walls of dry, V-shaped creek beds. Removal of an occasional overload or talus by bulldozer has proved successful. Most of the fifteen fossil sites consist of paper shale, and some of white or brown silty material composed of re-worked volcanic ash. This extremely fine material permitted faithful reproduction of the most delicate plant or insect structures in the form of darker imprints. Upon being split, the slabs of shale yield counterparts or mirror images of organic remains. During the past twelve years approximately ten thousand specimens were collected, among them many species new to science. The flora is interpreted as an early- to mid-Tertiary, semi-arid and temperate assemblage. Thus ferns are rare, gymnosperms more frequent, and angiosperms by far the most numerous. Among evergreens we find pine, spruce, fir, *Glyptostrobus*, and *Metasequoia*. The deciduous flora consists of a predominant streamside element, open forest trees and shrubs, and some xeric representatives including perennial herbs. Nearly all forms have living representatives in North America and Asia, whose structural parts, such as leaves, bracts, calyces, flowers, fruits, and seeds may be identified through living or herbarium material.

In relation to other known fossil floras, the Ruby assemblage promises to become one of the most extensive, regionally restricted floras in this country. The majority of specimens will be incorporated in The New York Botanic Garden fossil collection, thus extending its scope and value as an active source for study. As the only collection of its kind in New York City, it is to be hoped that it will stimulate anew this phase of basic botany, that forthcoming publications and publicity will also thaw the budget and good-will of our City Fathers, and induce them to provide permanent sustenance for this endeavor.

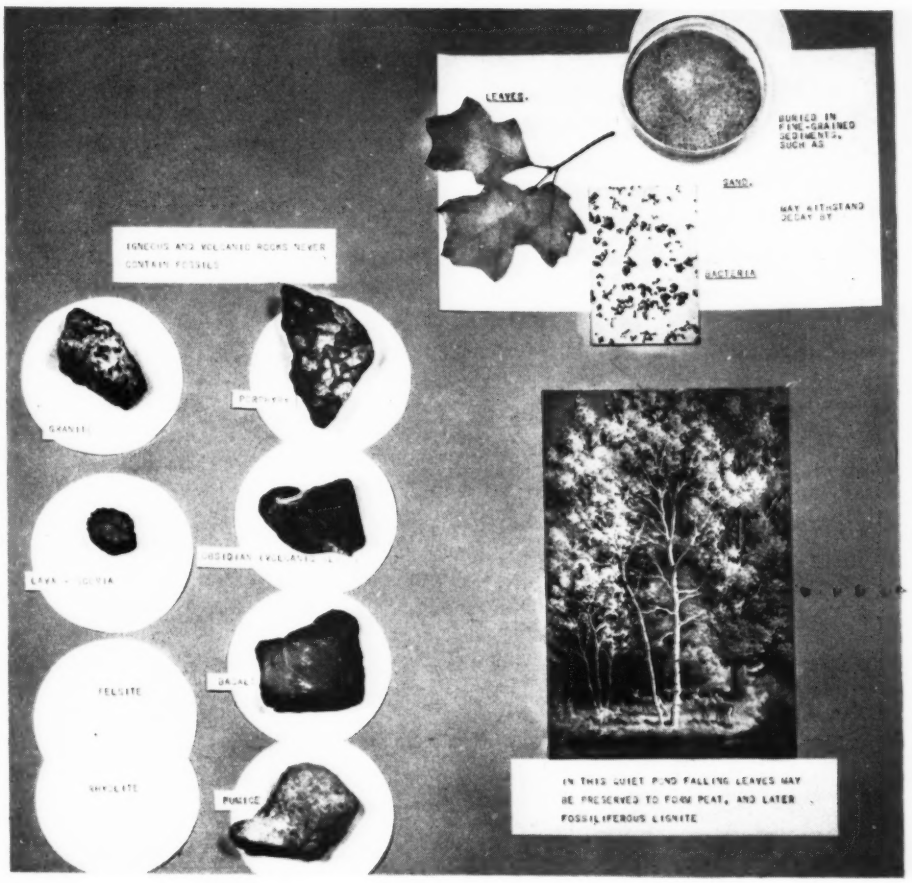
PORTAGE (from page 9)

returning to England caught afire in the Atlantic on August 6, 1852; while Wallace survived nine days adrift in a lifeboat before being picked up by another ship, all his specimens were lost.

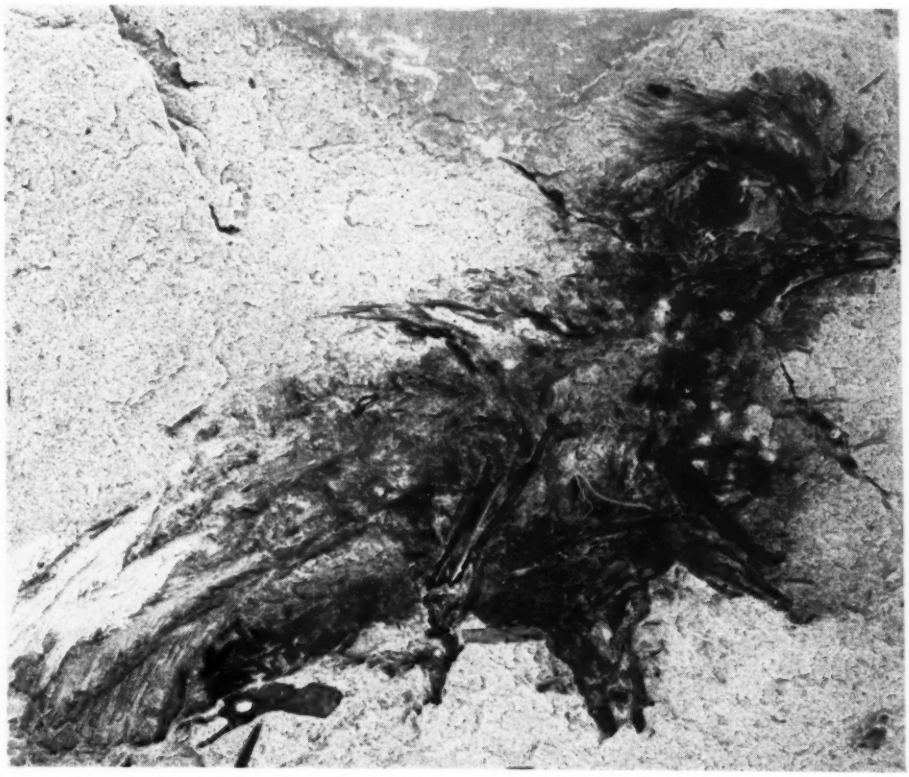
Wallace is cruelly neglected in the plaudits of the modern scientific world. Darwin recognized a peer in the great field naturalist and said: "You are the only man I ever heard of who persistently does himself an injustice, and never demands justice. But you cannot burke yourself, however much you may try." Wallace had not only infinitely greater field experience than Darwin and opportunity for personal observation in fitting together the evidence for natural selection, but was also a person of much more diversified interests. He published tracts on economics, land nationalization, spiritualism (in the Victorian sense), and vaccination. One of his final efforts was editing the travel notes of his good friend, Richard Spruce.

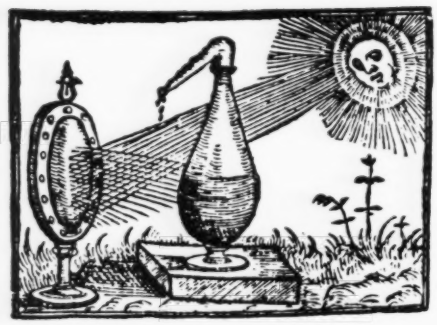
Spruce was the last of a renowned nineteenth-century natural history triumvirate to visit the portage. He reached Pimichín on June 10, 1854, and proceeded to Yavita the next day. He was at the far end of his lowland travels from the mouth of the Amazon and also on the verge of the severe fever, that later incapacitated him for thirty-eight days in San Fernando de Atabapo. His written impressions were brief, despite his exultation at being in "Humboldt's country." He returned an invalid from San Fernando on August 13 and was carried across the trail in a hammock.

Recent scientific visitors to the portage have included Llewelyn Williams (1942) and a group of Venezuelan and German ecologists (1958). The New York Botanical Garden expeditions have visited the height-of-land on five different trips, most recently in June, 1959. Even twentieth-century visitors have continued to collect plants previously unknown to civilization, and all gain the impression of a benevolent rather than an inimical jungle. While it is now possible to ride across the trail in a sporadically functioning jeep, the park-like stroll is much more rewarding. All walkers echo the reflection of a Maroa doctor, long-time resident in Venezuela, that the Yavita-Pimichín portage is the most serene place he had known in the tropics.


LEAVES.
BURIED IN FINE-GRAINED SEDIMENTS, SUCH AS
SAND.
MAY WITHSTAND DECAY BY
BACTERIA
IN THIS QUIET POND FALLING LEAVES MAY BE PRESERVED TO FORM PEAT, AND LATER FOSSILIFEROUS LIGNITE

A fossil bird, about three and a half inches long, with a prominent crest. It suggests affinity to a kinglet or titmouse. This is from the Oligocene Ruby paper shales.





A Country Housewife's Garden

By Gertrude B. Foster

Mrs. Foster is Editor of the HERB GROWER MAGAZINE

THOSE OF US who are on the seed catalogue lists have learned to take the super-duper snaps and petunia pictures with a few grains of salt. Ever since the Shakers introduced the garden seed industry into this country about 1789, the gardener has been fair game for the grower's gorgeous paintings of annuals that seem larger than life-size in the bleak months of winter. With the advent of color photography, the buyer is better assured of something nearer veracity in the claims of seedsmen, and with so many variables in soil and care of plants, it isn't really their fault if your own plants do not measure up to the ones on the printed page.

In their interesting monograph SHAKER HERBS AND HERBALISTS, Edward Deming and Faith Andrews state that:

"In their herb and seed industry, the Shakers introduced certain merchandising practices later adopted by the "world." For the wholesale trade they put up seeds in cloth bags, but they retailed them in small "papers" or "envelopes" as is the present custom. In 1836 the New Lebanon Society also began to issue gardeners' manuals, priced at six cents, which gave useful instructions for the selection, preparation and management of a kitchen garden, with additional chapters on injurious insects, the preservation of vegetables in winter, the uses of vegetables, cooking recipes and pickling. Commenting on the right care of a vegetable plot, the compiler notes that "a garden is an index of the owner's mind." (The charming monograph, SHAKER HERBS AND HERBALISTS, was printed by Carl P. Rollins, New Haven, Connecticut, for the Andrews and the Berkshire Garden Center, Stockbridge, Massachusetts, on the occasion of a Shaker exhibit staged by Dr. and Mrs. Andrews at the Center in July, 1959.)

Having received the very attractive and clever catalogue of a mail-order nursery, famous for its flowers of one color, which is illustrated only with line drawings and pretends to no extravagance except in its prices, I had a chance to stop there last spring. If a garden is an index of the owner's mind, a nursery gives a clue to the buyers' madness, too, sometimes. The front of the nursery with many flowers in bloom looked as appealing as a show window. On drawing nearer I found that it actually was a huge super-market for plants. The buyer picked the potted plants out of frames and placed them in a little wagon to be taken to the check-out station. I never found out where that station was, because so many people were buying and the men serving them were so busy running back and forth, picking up the pots and putting them in the wagons despite the "self-service" signs.

Following the invitation of one large sign to "see our two acres of gardens," I wandered back on the hill away from the super-market bustle. There I looked for herbs, of course, and also for the gardens. What I saw was row on row of deep coldframes filled with grass and weeds with groups of trees or shrubs in rusted tin cans standing in them. Finally I located some plants with their roots in the ground, in the old-fashioned manner of a nursery, but they were also pretty well choked with weeds. Never finding the gardens, I returned to the road-side display and asked the price of *Artemisia schmidtiana nana,* the lovely 'Silver Mound' which makes an irresistible lure with its shimmering silver foliage. I was told that the price was on the plant. When I protested that I hadn't found it, I was curtly dismissed with "nothing comes down here unless it is marked." I thought to myself, "and unless it is in bloom." Finally the salesman sensed my impatience and walked over to the potted plants and turned the label around and read off the price. It was stamped, super-market style, on the back of the wooden label but not in sight for the customer, unless he took it out of the pot and turned it around. Then I looked at the backs of some more labels and seeing one marked ninety cents in a small pot of *Ajuga reptans*, I took myself off, sadder but wiser. Unlike the owners of the limousines parked out front, I decided that I liked the old informal relationship between the grower who loved his plants and the customers who bought them.

I have had enough experience in growing and selling herb plants to realize that it has been, up until now, a difficult thing to run a nursery and make money, too. The large growers usually stick to a few varieties and sell the plants wholesale at proper planting time. The small flower garden nurseryman spends a lot of time digging plants to order and walking about with the customer answering questions. As one old-timer told me, "The ladies always want to buy what is in full bloom and that is often not the best time to move it. Also they want to break it in two when they get home to share with a friend, which usually results in two dead plants instead of one live one." His was an up-hill row to hoe, educating as well as growing.

Middlemen in nursery plants are springing up all along the roadsides, like the pansy purveyors that used to set out baskets of the kitten-faced flowers by their store windows in the spring. To me they seem more sincere in their aims, because it is possible to set out pansies in full bloom and scarcely lose a leaf. But the nursery that offers "rare plants" super-market style and then carts the out-of-bloom and unsold plants back up the hill to its "gardens" to languish in rusted tin cans and stay stunted in paper pots until next season is something to make the sincere Shakers tremble again in their graves. The roadside stands where potted plants are sold do not pretend to be nurseries. When the plants are past their best, they are marked down for quick sale or given away. These roadside stands are not mailing out fancy catalogues offering the best of everything at all times. This seems to be the application of the advertising business to the art of flower growing. How long will it work with real gardeners? Perhaps only as long as people forsake quality for quantity.

Another trend in nursery practice is

(Continued on page 17)

Rodriguezia teuscheri thrives fastened to cork bark.

RODRIGUEZIA TEUSCHERI

By H. Teuscher

Mr. Teuscher, who is Curator of the Montreal Botanical Garden, has had two other orchids, in addition to the above, named in his honor—*Telipogon teuscheri* and *Epidendron teuscherianum*. A new orchid genus, *Teuscheria,* also bears his name; it has three species, and a plant, that reached Mr. Teuscher in July 1959, may prove to be a fourth.

Mr. Teuscher was dendrologist at The New York Botanical Garden for three years, leaving in May 1936 to become superintendent and chief horticulturist of the then new Montreal Botanical Garden, supervising the planning, construction, and preliminary planting. This institution has developed greatly in the passing years; the grounds and gardens are very beautiful. In the new conservatory complex, which now consists of nine large units, five have been fully planted, the others are being planted. And Mr. Teuscher is correct in saying, ". . . the conservatory will be quite sensational when all the plants have been set out and have at least a year or two in which to develop".

The following article is reprinted from the American Orchid Society Bulletin, June 1959.

PERHAPS, I should not myself write about this pretty little orchid which bears my name, but I was the one who first found it in the Ecuadorean jungle, and, in consequence, I know more about the history of its discovery than anybody else. The natural conditions under which it occurs and an account of the other plants which grow within little more than one hundred yards from it should be worthwhile to set down for posterity.

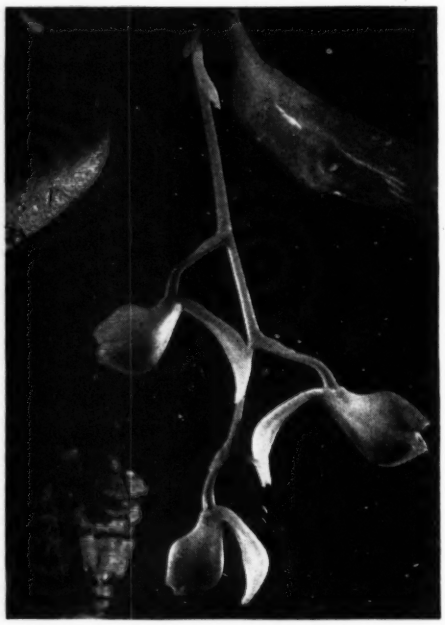
In the first place, I have to acknowledge that without the initiative of my friend, Señor José Strobel, in whose home near Cuenca my wife and daughter and myself stayed during our visit to Ecuador in the spring of 1956, I would undoubtedly never have seen the forest which I am describing below. Señor Strobel had visited this place previously and had found it so interesting that he wanted to show it to me. Secondly, if it had not been for the fact that at the time Señor Strobel was sitting high up in a tree, gathering plants of the beautiful *Oncidium falcipetalum* Lindley which was in flower but was determined later, he would quite surely have been the one to find this rodriguezia. He has the eyes of an eagle and can see orchids of particular interest from a distance which I am unable to do. I still remember how excited I was when, on wandering around on my own, I noticed the little plants on the bare branches of a tree. They were not in flower, but their habit of growth suggested to me right away that they must be a rodriguezia.

But, let us start at the beginning. The forest we visited is located near the road Cuenca-Guayaquil, and in spite of the fact that this road connects two of the three largest cities of Ecuador, it is very bad — not paved, of course—and in parts at least it is distinctly dangerous. It climbs over mountains to a height of over eleven thousand feet, goes steep down again to as low as eight thousand feet and climbs once more, winding endlessly in sharp, blind curves with an abyss on one side and a steep slope on the other. Guard rails on Ecuadorean roads are unknown, and when the bus travels only a few inches from the edge, as it frequently does because the roads are narrow, one looks a thousand feet or more down into a deep valley with a turbulent river at the bottom. To cheer up the travelers, the bus stops from time to time at newly erected wayside shrines, marking the place where a bus with thirty passengers has recently plunged over the edge, killing everybody in it. One has to develop a fatalistic attitude when traveling in Ecuador, but if one does, a trip over these roads certainly is memorable because the Andes are unbelievably beautiful. Fortunately, our bus had an exceptionally skillful and careful driver which made us feel perfectly safe. The bus stopped for lunch at the town of Ducur (seventy-five hundred feet), and thereafter the road commenced to wind down gradually to the coast.

Some twenty or thirty miles beyond Ducur, Señor Strobel asked the bus driver to stop at a road construction camp, located at an altitude of about thirty-four hundred feet. Unfortunately, this camp had been deserted since Señor Strobel had been there last, but its shacks were still standing and a caretaker had been left behind. The latter allowed us to sleep in one of the shacks—it was already getting dark by then—and his wife agreed to prepare meals for us. The shack assigned to us was in good condition but perfectly bare, and we had to sleep on the floor. Since the weather was warm—it must have been around 75° F. when we arrived—this did not seem so bad, but I had not counted on a temperature drop of at least 20° at night. The prevailing dampness—this was a distinctly wet region—made a temperature of 50° or 55° seem very chilly, and we had only one blanket each. Besides, my old bones complained mightily of the hard floor. I do not remember ever having

Left. The pretty flowers of *Rodriquezia teuscheri* are fragrant in the morning.

Below. Characteristic are the united lateral sepals, which are at first suspended free under the rest of the bud.



been so uncomfortable in my whole life, and I slept very little.

In the morning, despite a persistent drizzly rain, we went into the surrounding forest. These woods really looked the way one usually pictures a tropical jungle. The vegetation was extremely dense and fabulously rich. The trees were thickly covered with moss, and the ground was a tangle of fallen rotting tree trunks. I gathered three different species of *Selaginella,* but they are very difficult to bring home alive, and only one of them survived the hardships of travel. Several handsome gesneriads were present also. One, which has since flowered several times in our greenhouses, was determined by Mr. Raymond, a member of our staff, as *Trichantha minor*. It had been introduced into England over one hundred years ago but has long since disappeared from cultivation. My collection established its native origin which was not known at that time. A second gesneriad with smaragd-green leaves which are gold-powdered in the center —very handsome even as a foliage plant—has so far, unfortunately, refused to flower with us. The chances are considerable that it is new to science. A third one, which is half shrubby and grows upright with rather hard large leaves, shiny dark green above and bright red underneath, is now flowering with us with masses of tubular bright yellow flowers. It evidently is a new species of the genus *Alloplectus*. Among the orchids I picked up was a maxillaria which was not in flower. Later, when it flowered in our greenhouses, L. A. Garay, Curator of the Ames Orchid Herbarium at Harvard, recognized it as a new species which he named *Maxillaria tentaculata*. Its sepals have long tails and the whole flower is soft mauve in color, rather unusual for a maxillaria and distinctly pretty.

Besides the above-mentioned *Oncidium falcipetalum,* which is closely related to *O. lamelligerum* but has somewhat smaller, yellow and reddish spotted flowers, we also found a brassia. This was in flower, and I took it to be *B. longissima*. Later, however, Mr. Garay told me that it fitted perfectly Reichenbach's original description of *B. antherotes*. Having seen this description I am forced to agree, but I am still not convinced that it is possible to keep these two species separate. If it isn't, the name *B. longissima* has to be dropped and the older name *B. antherotes* has to take its place for this whole concept. There also was, as later determined, *Maxillaria microthrica* Schlechter and *M. attenuata* Ames & Schweinfurth, *Pleurothallis cardiostola* Rchb.f. and *P. monocardia* Rchb.f. as well as the odd *Cryptocentrum jamesoni* Benth., the plant of which looks like an amaryllid rather than an orchid. Neither of these last named five has ornamental merit.

Stanhopea insignis Frost which occurred rather frequently is more worthy of mention, and the rare *Stanhopea tricornis* Lindley, determined from a plant previously sent to me by Señor Strobel, which had also come from these woods but which we did not find this time, must not be omitted from the list.

Scelochilus pichinchae Schlechter, determined when it flowered in our greenhouses, is not very exciting; but its drooping panicles of bright yellow flowers, usually produced twice during the year, are quite pretty. Orchid fanciers, who are fond of small orchids and who have seen it here, have always exclaimed over it. It grow together with *Rodriguezia teuscheri,* and this latter I must now describe.

Rodriguezia teuscheri occurred only on the edge of the forest and always grew only on trees with smooth bark which did not permit the formation of moss. Together with the fact that this was a wet region with frequent rains, the clues for the proper treatment of this orchid in cultivation were plain to read. It thrives best when fastened to cork bark—suspended either horizontally or vertically—without or with only very thin osmunda padding, but with frequent wetting (several times a day) including occasional dipping in a mild fertilizer solution. A greenhouse night temperature of 60° F. is satisfactory, but during the day the temperature should rise to 75° F. Under this treatment this plant usually flowers twice a year.

The drooping raceme has only three to four flowers but these, besides being fragrant in the morning, are rather pretty. On opening, the sepals are greenish yellow outside and the lip also has a greenish sheen with brownish red markings. Within a day or two these colors intensify, the sepals develop a red flush and the lip becomes bright yellow in the center, its margins turning white with a purplish red flush. The rear of the lip is striated deep purple. Most striking and characteristic are the united (connate) lateral sepals which, as the photos show, are at first suspended free under the rest of the bud. When the buds are ready to open they reflex completely, and on the fully opened flower they give a very good imitation of a long curved spur. The other species of this genus which are in cultivation do not reflex

(Continued on page 18)

PUBLIC GARDENS OF MALTA

By **Bernerd C. Weber**

Mr. Weber is Professor of History, College of Arts and Sciences, University of Alabama, and was a Fulbright Research Scholar at the Royal Malta Library for the academic year 1956-57.

MALTA, the prehistoric "sacred island" of the Mediterranean Sea, the one-time dominion of the militant monastic order of the Knights of St. John of Jerusalem, and one of the well-known naval stations of the British Empire, is undoubtedly one of the most interesting spots in Europe. Of Malta's historic structures and archaeological points of interest much has been written, but comparatively little has been said of the beautiful gardens to be found on this small and relatively arid Mediterranean island. Yet these gardens possess both botanical and historical interest and deserve attention.

One of the oldest and most important gardens in Malta is the Boschetto, a veritable paradise of green, which lies below the rocky eminence of the fortress-like villa built in the late sixteenth century by Cardinal Hugues Loubeaux de Verdalle, one of the Grand Masters of the Order of St. John. The Boschetto is noted for its evergreen oaks and its terraces of orange and olive trees, loquats, and aromatic shrubs. On a warm evening the scent of the Aleppo pines and of the cypresses blending with the fragrance of rosemary, lavender, and wild thyme make the Boschetto one of the most attractive and delightful spots in the whole island.

The San Antonio gardens were established by Grand Master Antoine de Paule about the year 1625. These gardens contain some very fine orange and lemon trees and a considerable collection of ornamental trees and plants which from time to time have been imported from all parts of the world and acclimatized. Here one may see the leaves of a South American jacaranda mingled with those of a North American juniper. There is a stately group of Aleppo pines and cypress trees and a fine English oak of great age. All the avenues are flanked with beautiful flower beds, while near the avenues are glasshouses containing collections of tropical and sub-tropical plants. San Anton Palace, which is surrounded by these attractive gardens, now serves as the winter residence of His Excellency, the Governor of Malta.

Near the Hotel Phoenicia, luxury headquarters for the tourist trade, are the Maglio Gardens, located in Floriana, a suburb built between the inner and outer land defences of the capital city of Valletta. These gardens consist of two broad parallel walks separated by ornamental trees and flowers and further adorned by various bronze and marble busts of noted persons. The gardens take their name from the French ball game of palamaglio, especially popular in the seventeenth century and played by the Knights of St. John on this very spot. On warm days the walks are a popular promenade for nurses and a playground for children. On either side of the gardens lie two great pavements, the Parade Ground and the Granaries, where one may see curious jar-shaped pits sunk into the rock and sealed with circular stone slabs.

Across the road from the Maglio gardens are the Argotti Botanic Gardens, now under the jurisdiction of the Royal University of Malta. There is a very comprehensive collection of plants, including interesting local species, in these gardens. The cacti collection is particularly noteworthy. From this area also one may enjoy a panoramic view of much of the island. In the foreground looms the huge hospital of St. Luke, and on the skyline may be seen Verdalla palace and the towers of the medieval walled city of Mdina.

In Valletta, the capital city, there are three small but interesting gardens, all built upon the military bastions of this city. Near South Street are the relatively secluded Hastings Gardens, established in memory of the Marquis of Hastings, Governor of Malta from 1824 to 1826. Near the entrance to the Grand Harbor is the lower Barracca, once a place of recreation for the Knights of St. John. Graceful arcades ornament the harbor side, but the principal feature here is a fine monument in the style of a Doric temple decorated with allegorical statues. The monument, built by public subscription in 1810, honors Sir Alexander John Ball, the first British Civil Commissioner of Malta. The Upper Barracca, established during the 1660's, has an incomparable terrace which overlooks the Grand Harbor and provides one of the finest views in the whole island. Within the enclosure of the Upper Barracca are long arcades to the left and in front. Numerous memorials adorn this place. Of particular interest is a bronze bust of Sir Winston Churchill, presented to Sir Winston by the people of Malta and placed on this spot at his request. The white stone base is inscribed:

TO
THE RIGHT HONOURABLE
SIR WINSTON SPENCER CHURCHILL
K.G.
THE
PEOPLE OF MALTA AND GOZO
MCMLV

In the center of the Upper Barracca is a simple sarcophagus type of tomb in red-brown stone dedicated to the memory of Sir Thomas Maitland, Governor of Malta from 1813 to 1824. Because of his forceful and dynamic personality he is better remembered as "King Tom."

In addition to these public gardens there are, of course, many private ones, for the Maltese people are lovers of the beautiful. Because of their historic associations, the public gardens of Malta give one a glimpse into the past and some insight into how the present has come to be. They are indeed a fitting adornment for that Mediterranean island which has been the great link between East and West on the track of the everlasting voyages of mankind from the rising to the setting sun and from the setting sun to the morn.

HOUSEWIFE'S GARDEN (from page 14)

described very graphically in instructions to people who may want to make money in spare time by "collecting native trees, ferns and wildflowers" in THE HERB COLLECTOR'S MANUAL AND MARKETING GUIDE, published by J. Kelly, Looneyville, West Virginia. I quote with spelling unchanged:—

"There is big business in collecting native trees from the woods for resale to nurseries located throughout the land who will plant these and grow them on to larger trees that may be sold for landscaping, shade and ornamentals . . . These trees are wanted in sizes from 18 inches to 6 foot . . .When you get them into your storage place where it be inside or out, immediately grade and sort the trees into kinds and

sizes. The smaller sizes may be tied in bundles of 10 to 25 and placed in piles keeping the roots damp and covered with burlap. As soon as possible they must be healed either in the ground outside or in some material such as sand, sawdust or loose damp soil inside. . . . Larger trees should not be tied in bundles before placing in the healing in material as you cannot get the roots all covered good. After you once have them well healed in you won't have to bother them again all winter unless they are inside where the material may dry out and if so you will have to provide water to keep them damp. Inside storage should not be kept too warm as this will cause the trees to start growth which will ruin them for planting. Keep them in a cool place. If you keep them where it freezes it will not hurt them one bit. The only thing about this is that you cannot bother them while they are froze and if you should want to ship during a freeze you would have to wait till they thawed out. . . . Many are grossing over $3,000.00 yearly with this plan and you can do the same as the demand will continue to increase as the population increases."

Fortunate are we who live in the country where it is possible to pick out our plants from nursery rows or greenhouse benches. One small unadvertised but thoroughly sincere family greenhouse business near us is aptly called "The Happy Gardeners."

RODRIGUEZIA (from page 16)

their lateral sepals in this manner.

The trees of this forest also contained many handsome bromeliads. One, in particular, was very conspicuous, forming large, wide-open cups with the leaves being scarlet for two-thirds of their length, while the inside of the cup was bright yellow. This was determined by Dr. Lyman B. Smith as *Guzmania sanguinea*. Others which were determined after they flowered in our greenhouses were *G. angustata, G. strobilantha, G. gloriosa,* and *Tillandsia narthecioides*. Three other large species are still to be identified.

We should, of course, have stayed longer because we merely skimmed the edges of this wonderful jungle forest, but my daughter, who had accompanied me, and I were exhausted from our sleepless night and felt that we could not possibly face another one like it. Señor Strobel must have been terribly disgusted with us weaklings, but he did not show it and he did not protest when we said that we wanted to go home. So we left at noon, after only half a day's collecting, when a truck going to Cuenca picked us up on the road. Since I slept most of the way back, I remember little about the return trip. However, there was a sequence. I have just learned that on November 21, 1958, the very same bus on which we had felt so safe—it was No. 22 of the Nueve de Octubre Co. —suffered a terrible accident only two kilometers (about a mile and a quarter) from the road construction camp at which we disembarked. It turned over six times and rolled down the embankment. The driver was killed and all passengers severely, some fatally injured. This shows that one never knows when one is lucky.

SNOWSHOES FOR BOG TRAVEL

By Frank C. MacKeever

Mr. MacKeever is Custodian of the Herbarium of The New York Botanical Garden.

ANY OF the standard models of snowshoes make excellent means of traveling over bogs—especially quaking bogs.

However, before going into the matter, I should like to offer a few suggestions. When you travel over bogs—especially the quaking or floating types —it is *a must* that you carry a six- to nine-foot stout pole. I use a bamboo pole on which a rug has been rolled. Always carry it under an arm, or across your shoulders with your arms draped over it. Perchance you "drop through," it will then function as a plank does on thin ice and will help to keep you "up." I consider this as important as the spare tire in your car.

Another thing — should you ever (Heaven forbid!) "get stuck" in quagmire or quicksand, never fall forward! Fall backward! Throw out your arms! Grab for vegetation — or whatever there is of terra firma. By falling backwards, you have far greater control of the movement of your legs.

Do not get alarmed. Lie back and think things out. Remember this, if you can "float" in nice clear water when swimming, you can stay afloat in that "pea soup" with very little paddling of the hand—if any is necessary.

Bogs hold a great fascination for me —their construction—their flora—their fauna. Learn more about them — and your snowshoes will aid you in doing so.

I have used snowshoes any number of times in such terrain and have often wondered why someone else had not thought of giving them a try.

My favorites are a pair of the famous "pickerel" model, because they are long and narrow, and length seems to me to be more important than width in bog traveling.

Lacking snowshoes when I really needed them, I have fashioned a pair from two long saplings of stout wood, such as hickory or oak, and some three-quarter-inch chicken wire.

It might be wise for you to study the construction of a pair of snowshoes, when you get the chance, so you'll know how they are made. However, here's how I do it.

Bend an eight- to nine-foot sapling, about an inch in diameter, into the shape of a snowshoe and tie the two ends together with wire or strong cord. (Naturally — you make two.) Place this frame on a strip of three-quarter-inch chicken wire, forty-eight inches long by eighteen inches wide, or nearly these dimensions. Bend the chicken wire up and around the frame, using the cut ends of the wire for fasteners. Extra pieces of wire, or strong cord, may be used at intervals along the frame in order to fasten the chicken wire to the frames more securely.

When this has been done, weave a piece of sapling, about the same size of the sapling used for the frame, through the mesh of the chicken wire and across the upper edges of the frame *(some may prefer it under)*, about sixteen or eighteen inches back from the front. Cut off the surplus tips and fasten the ends to the frame with wire or strong cord.

Now place the ball of your foot (shoes on) on this piece, and cut out a hole large enough to permit the toe of your shoe to move through it freely. Still better, make a small hole first, and then bend the wire back so as to form a smoother edge to the hole of the required size. Also, this will give more strength and rigidity.

(Continued on page 22)

No solid walls or enclosures obstruct the full view of the surrounding landscape from Sterling Forest International Research Building. The tiles with tulip motif were specially designed for the building.

The Story Behind A Major New Garden

By **W. Fred Johnson**

Mr. Johnson is the Director of Sterling Forest Gardens.

STERLING FOREST GARDENS, now being created on a one hundred and twenty-five acre tract near Tuxedo, New York, will open to the public May 1, 1960, with a display of one and a half million hyacinths, daffodils, tulips and other Dutch bulbs. Planning a single huge floral display such as this is a tremendous job in itself, but it is only a small part of the work being carried out, for the Gardens must be kept in continual bloom straight through the summer and into fall.

Our staff has traveled thousands of miles in this country, and Robert L. Dowling, President of City Investing Co., and other members of that organization, which is co-sponsoring the Gardens, have visited such famous foreign gardens as Tivoli in Rome, the Gardens of Versailles, Kew Gardens, Keukenhof in Holland, and even the famous gardens of Japan. All this was done to study methods of presenting constantly new floral displays and to observe at first hand the ways in which the interest and delight of visitors can be heightened in a garden.

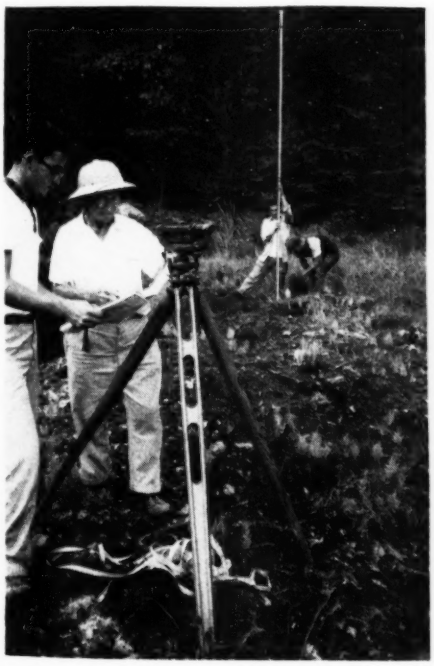
FREQUENT NEW DISPLAYS

At Sterling Forest Gardens, we plan to introduce new floral themes every two weeks from May through the summer and far into the fall. Dutch bulbs —incidentally, the largest such collection in any garden in the United States —will give way to the finest and newest in iris and roses. Then annuals and perennials will come into bloom, to be followed in the autumn months by tremendous displays of chrysanthemums.

Sterling Forest Gardens are located in the foothills of the Ramapo Mountains, in a setting of woodland, meadow and rugged foothills. A number of small lakes have been created on the grounds, and unusual fountains, including a representation of the rain-tree, mythical tree of good luck and happiness, are planned to delight further the eyes of visitors.

EXOTIC BIRDS

The area being a wild one, there is already considerable bird life in the Gardens, and we believe that it will



Left. A survey team works in a woodland section of the extensive tract. Every stone and tree in Sterling Forest Gardens is shown on the huge topographical maps, that were used as planting and permanent guides.

Swampy sections had to be drained in summer 1958, so that they would be dry enough the following year for the heavy equipment needed in developing Sterling Forest Gardens. Other areas were so thick in brush that Dutch landscape architects actually got lost in them.

Above. Drainage was one of the major problems in creating Sterling Forest Gardens, for without a complex and highly efficient drainage system a heavy downpour could do extensive damage.

Below. A section of Sterling Forest Gardens begins to take shape, in preparation for some of the huge plantings. Trees and native flora were carefully preserved.

Nature — Friend and Foe

Many times the elements of nature that have worked against us were the very ones we wanted to harness and have work for us. The principal ones, of course, were weather and water — water in the form of rains, floods, torrential downpours, masses of water falling and flowing across a very narrow area confined between hills.

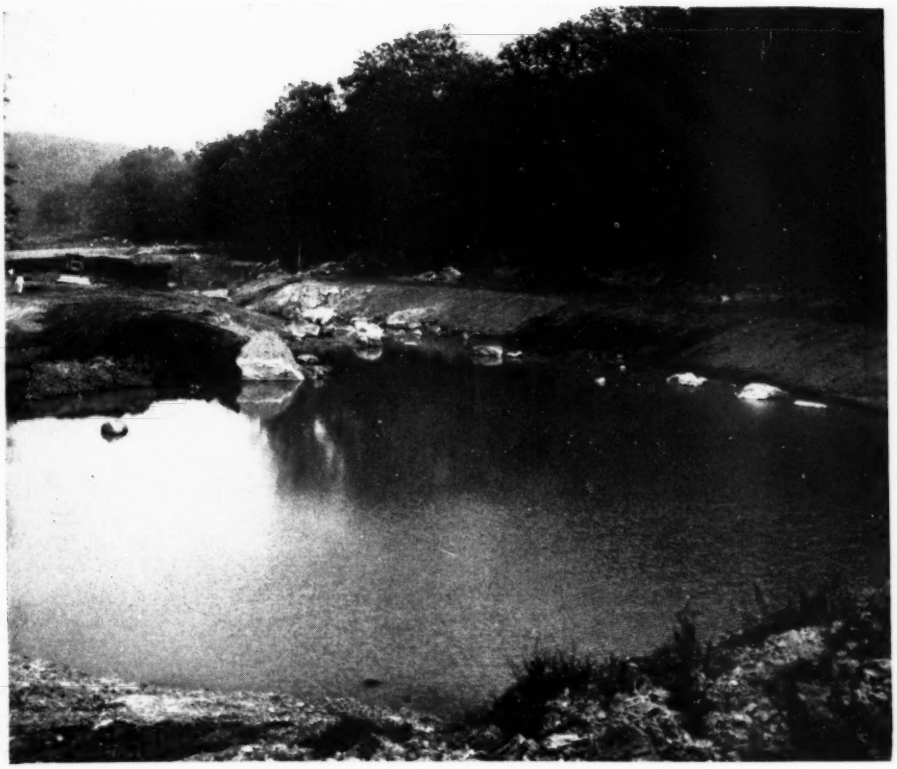
The main part of the Gardens is located in what was a swamp two years ago, with several feet of water standing in it. It was surrounded by wooded hills, which created a basin through which floods poured. Deposits of peat and clay in the swamp had been covered by water for centuries, perhaps thousands of years, and our first task was to cut huge drainage ditches fifteen feet deep through the area to permit this water to drain out.

A Solution Found

After much study and experimentation, we learned that it would be impossible to drain the underground water regardless of how many ditches we might dig, for it was trapped by various layers of clay and peat in a very complex arrangement. The only solu-

increase markedly as time goes on. But many of our native birds are rather inconspicuous; so to bring additional color and brilliance to the Gardens, exotic species will be introduced. We should like also to have a few of the deer native to Sterling Forest in the Gardens, but we have learned that they unfortunately have a very healthy appetite for the leaves of our hundreds of thousands of tulips! They will be fenced out, but can be seen roaming the other parts of the Forest.

No doubt everyone is going to exclaim over the scope of the Gardens and their wealth of plant material, but probably only one in a thousand visitors will realize that the story of their development has been, and continues to be, one of constant struggle against time and nature. We have been working for nearly two years to transform the area into this major floral showplace, and we have had as many as one hundred and fifty men and dozens of large and small pieces of equipment busy at the job through the spring, summer and fall of both 1958 and 1959.



A number of small man-made lakes will be a feature of Sterling Forest Gardens. Here is one of the lakes in its early development.

land). It will open when the flood level in the lakes reaches a certain level, so that heavy floods can be passed through the system and out of the Gardens without causing damage to them.

We had to think not only of how to get rid of the water but also how to get it back during the dry seasons, when plants need water badly and when the lakes might become dry. An irrigation system of pipes was installed. To make sure that the lakes do not go dry, we had to go to another swamp on a higher plateau above the Gardens, and this was converted into a ten-million-gallon reservoir and emergency water supply.

An Invasion

Another major problem in the development of Sterling Forest Gardens was the dense growth of brush in the swamp area. In fact, it was so dense

tion was to strip off the entire area and remake it completely with the clay as a base, then a deep layer of pervious sand and finally a layer of soil for growing the plants. By this method we were able to establish the underground water table at a desired level and to control it.

We had to prepare for flash floods of three- to five-inch rainfall within an eight-hour period. Such a devastating flood pouring down from the surrounding hills into the flat basin which would be the Gardens could destroy them.

"Dutch" Dam

Our solution was the creation of the series of lakes in the Gardens which are actually flood catchment basins, and which at the same time serve the aesthetic purpose of further beautifying the grounds. These catch basins are linked by underground conduits, permitting the flood of water to flow from one to another. Finally, the entire system is regulated by an automatic dam (called "Dutch" dam because the design is a copy of one we saw in Hol-

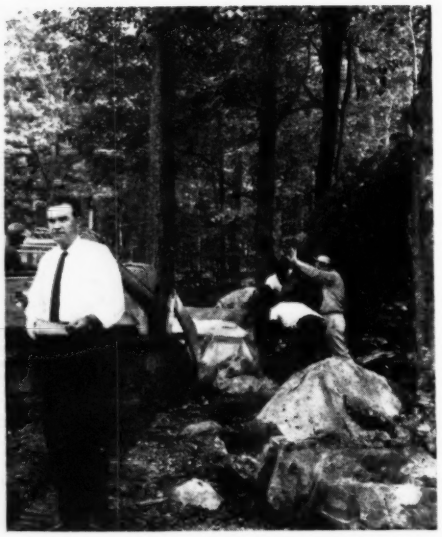
An unexpected dividend at Sterling Forest Gardens was the peat found in the swampy areas of the great flower meadow. Some of the peat is used to provide ideal growing conditions for the plants to come.

that two years ago Dutch landscape architects responsible for the overall garden design got completely lost in it for about thirty minutes when they were making an inspection tour. Finally we heard their yelling and directed them back to the highway.

Seventy-five men, thirty-five chain saws and several bulldozers worked for three months during the summer of 1958 clearing out the area. During the height of this operation the noise in the confines of this basin was intense—in fact, it sounded like an invasion!

Even while this clearing was going on, six crews were working continuously surveying the area, and two draftsmen were translating their information on to detailed topographical maps. These are unusually large in scale and unusually detailed — we know the location of every single tree and every single boulder in Sterling Forest Gardens, and also the depth of the soil everywhere within its bounds.

Joop Ruyter, one of the nine Dutch experts who supervised the planting of a million and a half Dutch bulbs at Sterling Forest Gardens, astonished American workmen by appearing in wooden shoes. He insists that they are the most practical and comfortable foot-gear for gardening work.



W. Fred Johnson (in white shirt, black tie), Director of Sterling Forest Gardens, oversees construction work. As many as one hundred and fifty men worked this past summer to get the Gardens into condition for their opening on May 1, 1960.

Rainy Day Blues

Great pains were taken to preserve every possible tree in the area, and also the shrubbery, such as the native laurel. With huge bulldozers and drag lines working all through the area, this was no simple task. Special equipment had to be selected and extreme supervision exercised for working the ground among the trees to prevent scarring them and damaging their root systems.

Spring of 1959 came, and even though we had studied weather reports for many years past, we began watching the skies as anxiously as a wheat farmer in the Middle West at spring planting time. We knew that when rains came our equipment would bog down and work would have to be stopped. Initially a heavy rain would stop work for ten days to two weeks. After the area was shaped and improved, this loss of time was reduced to two or three days. In our schedule of work we had allowed fifty percent lost time due to rains from June, 1958 to May 1, 1960, the opening date. We have needed every day of good weather.

Supreme Test

Our flood control system came to a supreme test at the last rain on Friday, Saturday and Sunday, October 22, 23, and 24, 1959, when a record rainfall of 3.5 inches descended within eight hours. Our hearts were in our mouths, as we watched to see if our system would work or if the Gardens would be destroyed. The system worked. The Gardens were not destroyed. Rather, within hours after the rainfall we were able to walk almost any place; within twenty-four hours we could walk in the flower beds and within forty-eight hours planting was resumed.

The Dutch have been cooperating throughout this mammoth project by the International Flower Show Committee of the Netherlands. When planting time came this fall, for the one million and a half tulips, hyacinths, daffodils, and other bulbs, they offered to see us through that immense operation by sending nine young experts to supervise our untrained men. We owe the Dutch lads a vote of gratitude for all their interest and for their drive in getting the work done.

We hope that this brief report gives horticulturists, gardening enthusiasts, and the general public some idea of the tremendous amount of planning and work that has gone into the creation of this new, major floral showplace. Creating the lovely spectacles which they will see beginning May 1, 1960, has been a major undertaking, with its full share of anxious and worrisome moments, hours and days. At the same time it has been an inspiring and exhilarating experience which more than two hundred men and women have shared. We hope, in turn, that the Gardens will prove an inspiring and exhilarating experience to the millions of people expected to visit them over the years.

FOR BOG TRAVEL (from page 18)

After you have made and used a dozen or more models, your own creative imagination and skill will come into play, and the final results of future models will be astonishing.

Fasten your famous and fancy snow sandals to your shoes by using regular snowshoe bindings or a strong rawhide thong. If you are a Scotsman (as I am), a strong piece of clothesline may be employed.

Once you have your "sample shoes" *(used by all shoe stores)* fastened to your feet, and you stand there wondering how to get underway—Well! Forget They Are There! "Do just what comes naturally." Walk naturally!

A DAY OF RECKONING

Our Shade Trees can be Attractive Assets or Costly "Green Elephants"

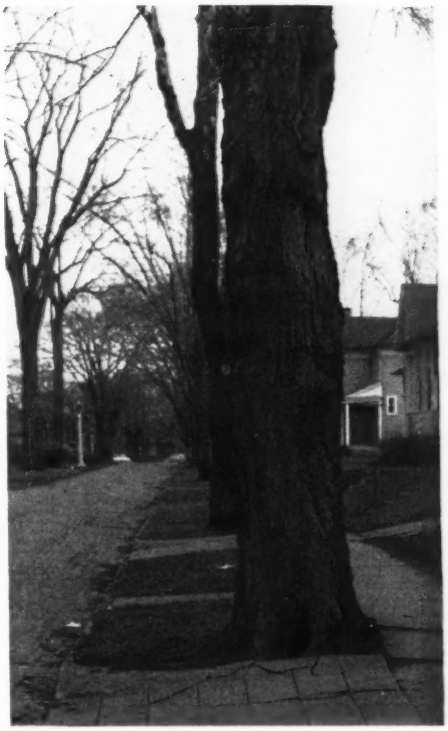
By **Jake Gerling**

Mr. Gerling, Superintendent of Maintenance, Parks and Playgrounds, Rochester, New York, has long advocated the use of better-adapted species and forms for more practical service on city streets and more gratifying use on home grounds. During the past twenty years, his illustrated lectures before interested groups in state universities and leading cities, and his informative articles, published in widely circulated magazines, have done much to bring about the present-day renaissance in arboriculture.

A DAY OF RECKONING IS HERE, proclaimed far and wide by the incessant whine of power-saws, as we labor at the Herculean task of eliminating huge, age-debilitated, disease-stricken trees from our city streets and dooryards.

To many people, the problems posed by king-size street trees, whether they are ravaged by disease or have outlived their usefulness and become costly liabilities, are merely 'headaches' for local authorities; but consideration of the following facts should alert taxpayers, everywhere, to their stake in these multi-million-dollar headaches which are taking such alarmingly disproportionate bites out of public-service budgets in so many localities. When phloem necrosis was rampant in Columbus, Ohio, more than twenty thousand American elms were killed, and the more than one hundred thousand remaining elms will very likely fall victims to the Dutch elm disease. Many cities have American elms and are now frantically trying to control this ruthless scourge which seemingly defies determined efforts to stay its devastating march. Canker-stain fungus blight became epidemic in Philadelphia a few years ago, and ten thousand plane trees were killed in a single year.

Every mature elm tree within the ever-increasing area of infestation, when finally felled by the Dutch elm disease, will have cost taxpayers at least one hundred dollars, the minimum unit expense, at present costs, for spray programs, sanitary control measures, and eventual removal; at this rate, a city having two hundred thousand elms within its corporate limits, and there are many such, may well have to spend twenty million dollars over the next few years. To this tidy little sum, we must add the cost of repairing curbing and sidewalks disrupted by heavy buttress roots, and enormous expenditures made by utility companies for constant line clearance work and repairs to power lines damaged by wind-shorn branches and storm-felled trees; these last items are a considerable part of the monthly service bill. For "insult added to injury", consider the plight of hapless home owners who have outsize trees on their property; if and when removal of such trees is ruled essential to an effective, all-out blight-control program, or deemed a public safety hazard by local authorities, the owners can be ordered to have them destroyed, at their own expense, "or else" (the "or else" being the city's prerogative of doing the work and tacking the cost on the owner's tax bill). Recent legislation in some states makes this procedure a very real possibility. A citizen, confronted with this unwarranted expense, may unexpectedly get a very cost-



Every tree on this street has broken the sidewalk or damaged the driveway.

There is no interference with the lighting system, when a street is replanted with the columnar form of *Acer saccharum*.

Magnolia soulangeana makes an attractive parkway planting.

ly what-not-to-do lesson in the proper selection of shade trees best suited for satisfactory service on the home grounds, but certainly will not "make the welkin ring" with paeans of gratitude to the planter whose poorly advised choice has burdened him with these ill-fated "green elephants".

Indeed, a day of reckoning is here, and general renaissance in city street embellishment is obviously needed. However, lest we be unduly harsh in our appraisal of 'inherited' plantings which have proved so unsuitable under present-day conditions, in fairness to those responsible we must give due consideration to those pertinent factors that, in their era, influenced their choice: elms, soft maples, poplars, and planes were easily grown, handled well, and were quite tolerant to the much less than ideal conditions afforded by street-tree-belt locations. Their large heads of foliage possessed properties held essential for required service: they acted as filters and arresters of dust raised by traffic on unpaved streets and sidewalk paths; transpiration of moisture had cooling effect during warm weather; shade cast by their immense canopies reduced the temperature in homes; and some forms made effective windbreaks. These reasons were perfectly valid, at the time, but are certainly worthy of little consideration now as determining factors in the selection of species and forms best suited for satisfactory service on streets or home sites in our modern cities. There is little excuse for continuation of practices proven inadequate; pavements, insulated and air-conditioned homes, and the negligible number of pedestrians on streets in residential areas have virtually eliminated need for the beneficial properties of towering trees which, desirable as they were in past generations, are far too costly luxuries for our times. Unfortunately, with inexcusable disregard for the high maintenance costs inevitable in street planting of poorly chosen, large-maturing, misplaced species, all too many 'weed trees' are still being planted by uninformed, or just plain irresponsible, city foresters.

Much of our present and immediate future distress could have been avoided, if "a voice crying in the wilderness" of king-size street trees, almost a half-century ago, had been heeded. This voice was that of Bernard H. Slavin, retired superintendent of parks in Rochester, the man whose keen foresight, inherent ability and earnest devotion to his work characterized more than fifty years of outstanding service in the development of Rochester's nationally known parks. As early as 1915, Bernard Slavin realized that overgrown trees, far too closely spaced, were becoming an expensive nuisance on city streets; and thousands of gaunt skeletons marking the ruthless spread of Chinese chestnut blight, then well on its way toward total destruction of this valuable species, alerted him to the fallacy of using any one species too freely in city-street plantings. Furthermore, the constant conflict of large trees and power lines was increasing, as utility installations kept pace with the rapid advance toward modern living, and the advantages to be gained by use of smaller-maturing species and their more compact variants became obvious. While dissatisfaction was voiced on every hand,

(Continued on page 29)

Costly storm damage from wind-felled, large street trees.

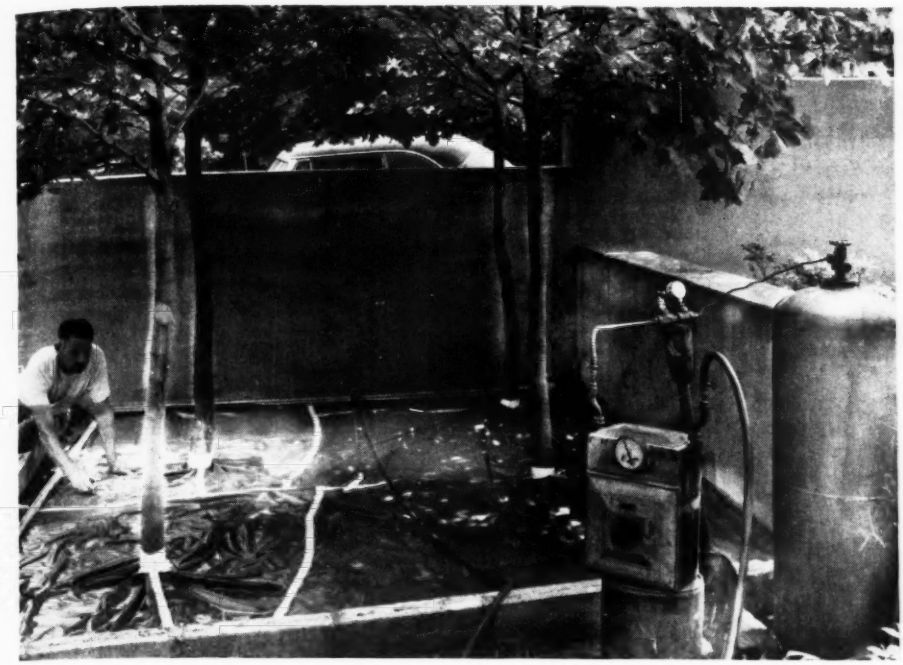


Fig. 1. Natural gas is being introduced into the soil around four- to five-inch DBH London planes. The gas is confined by walls and a plastic sheeting.

THE RESPONSE OF SHADE TREES TO NATURAL GAS

By **P. P. Pirone**

Dr. Pirone, Plant Pathologist of The New York Botanical Garden, presented this paper before the American Gas Association Claims Committee, Boston, Massachusetts, September 1959.

THE widespread conversion to natural gas in recent years has raised the question as to how toxic this substance really is to trees and other vegetation. Many papers have been published on the toxic effect of manufactured illuminating gas on plant life, but very little reliable information is available on the effect of the natural product.

In May 1956, the manager of the insurance and claims department of a well-known gas company in the New York area asked me about the toxicity of natural gas to trees. His company was being billed for large numbers of dead or dying trees, many of which were near leaking natural gas mains, but he felt that factors other than gas were responsible in many instances.

I advised this man that very little information was available on the subject, but that it was my opinion, based on the available information, that natural gas was relatively nontoxic as compared with manufactured gas. I told him I would be able to express a more definite opinion if I could conduct some specific tests with the natural gas. A modest grant to The New York Botanical Garden was soon received from the interested company to initiate these tests.

Before undertaking the research, I interviewed Dr. P. M. Zimmerman (who has since died) and Dr. A. E. Hitchcock at the Boyce Thompson Institute, Yonkers, New York, two of America's best-known experts on the effect of gases on vegetation. Both assured me that their earlier work indicated natural gas was nontoxic to vegetation. As a further assurance, I felt it would be wise to conduct a series of well-planned experiments anyway.

Greenhouse Tests

Our[1] first tests were started on July 9, 1956, in the plant pathology greenhouse at The New York Botanical Garden. The gas used was supplied in tanks by the cooperating gas company and was taken directly from high-pressure mains as it arrived from Texas. It had the following components in percentages: methane 94.5; ethane 3.6; propane 0.8; higher hydrocarbons 0.4; carbon dioxide 0.7; nitrogen 0.0. The specific gravity was 0.60 and the B.t.u. 1040.

The gas was introduced for varying periods directly to the roots of experimental plants growing in pots. The lower stem and the pots were enclosed in a moderately air-tight, ten-gallon, galvanized can capable of holding two plants at a time.

Because tomato plants had long been known to be extremely susceptible to certain components of manufactured illuminating gas, these were the first plants tested. Two-foot tall, vigorous 'Rutgers' tomatoes were exposed to the natural gas for periods ranging from four and a half to forty-eight hours. After exposure the plants were removed from the gas chamber and placed in the greenhouse, where they were grown for at least four weeks.

No abnormal symptoms developed in either the tops or the roots. All the plants remained healthy throughout the

Fig. 2. John Walther, the author's assistant, examines the foliage of Norway maple seedlings. The leaves look perfectly normal. The roots were exposed to a continuous flow of gas for nearly three weeks.

1. Miss Biruta Eimanis and John Walther ably assisted in carrying out these experiments.

Fig. 3. The roots and lower stems of the four Norway maple trees on the left were exposed to natural gas for six weeks in late summer and early fall 1956. Here, in May 1957, the leaves are as healthy as on the two ungassed control trees on the right.

course of the experiments.

The second series of pot tests were made on two-year pin oak seedlings. The roots of these trees were exposed to natural gas for periods ranging from four to forty-eight hours. The young trees were then removed from the gas chamber and placed in the greenhouse bench adjacent to ungassed pin oaks of the same age.

Two weeks after exposure, the treated trees actually looked greener than the ungassed trees. Apparently the introduction of natural gas into the soil around the young trees' roots caused growth stimulation similar to that resulting from the addition of a plant food. A similar effect was noted by Deuber[2] when trees were subjected to small quantities of manufactured illuminating gas.

Tests with Larger Trees

A third series of tests with the natural gas was made on four relatively large trees growing in one corner of our experimental garden. The trees were London planes *(Platanus acerifolia)* four to five inches in diameter at breast height. Cement walls bordered two sides of the garden corner. To confine the gas as closely as possible within the root area, walls of concrete-cinder blocks were built to a depth three feet below the surface on the other two sides. A special plastic sheeting, known as "Larvacover," was placed over the soil surface to further confine the gas in the soil.

The gas was introduced on August 1, 1956, by means of a tree-feeding needle inserted to a depth of two and a half feet at a point equally distant from the four trees. (Fig. 1) About two hundred cubic feet of gas were introduced into the root zone over a period of several days. The plastic cover was kept over the soil for nearly three weeks after the gassing.

The four gassed trees, as well as three others of the same age well beyond the treated area, were observed for the remainder of the growing season. Both lots continued to look normal. They also looked normal the following growing season.

Experiments with Moisture-Free Gas

The most extensive series of tests in 1956 were made with Norway maple seedlings, from September 5 to November 14. The trees were three to four years old and were growing in pots ranging from five to eight inches in diameter. The lower stem and the pots were enclosed in the ten-gallon can as in the early tests. (Fig. 2).

Fig. 4. Above. Close-up of specially made gassing chamber with London plane, Norway maple, and pin-oak trees before being gassed. A gas pipe leads into the drainage hole beneath each pot. Some of the control trees are next to the gassing chamber.

Fig. 5. Right. One of the author's sons is placing half of the lid on the gassing chamber.

The natural gas used in these tests was supplied in tanks by the Matheson Company of East Rutherford, New Jersey. It had virtually the same analysis as that used in the early tests: methane 93.5 per cent; ethane 3.5 per cent; propane 1.0 per cent; higher hydrocarbons 0.5 per cent; carbon dioxide 1.0 per cent; and nitrogen 0.5 per cent. The specific gravity was the same, 0.60, and the B.t.u. 1036.

To remove moisture, the gas was first passed through a drying tower containing anhydrous calcium sulfate, sold under the trade name "Drierite." This was done to determine whether moisture-free gas would dry out the soil around the roots and thus cause damage.

The gas was introduced into the root zones of six duplicate sets of trees for periods ranging from two to thirty-six days and in amounts varying from twenty-four cubic feet for the shortest exposures to eight hundred cubic feet for the longest exposures. Control trees of the same size and age were grown under identical conditions near the treated trees.

The soil around the trees subjected to the longer gas exposures was watered once a week by removing the seal between the trunk and the lid of the gassing chamber and adding water at that point before resealing the opening.

After being exposed to the gas, the trees were removed to the greenhouse for further observation. Control trees

2. Deuber, C. G. Stimulative Effects of Gas on Small Trees. Am. Gas Assoc. Monthly 15: 380-383. 1933.

Fig. 6. Dr. Pirone examines the foliage of Norway maples treated in 1958 with a mixture of natural gas and mercaptan. The leaves appear to be as normal as those of the ungassed control trees on the right.

were handled in the same way. All trees held their leaves until late December, and except for an infestation of spider mites on both gas-treated and control trees, they appeared normal.

The trees were then moved into coldframes for the winter. They were observed carefully during the following spring and summer. Both gassed and ungassed trees produced normal leaves during the 1957 and 1958 growing seasons. (Fig. 3).

Rye grass seed was planted in soil containing trees that had been gassed for eleven days. This was done as soon as the trees were removed from the gassing chamber. The seed sprouted within two days and grew as normally as that sown in ungassed soil. This indicated that natural gas, unlike manufactured gas, left no toxic residues in the soil.

Studies on Effects of Long Exposure

In the fall of 1956 I decided that more extensive tests over longer periods of exposure would be highly desirable. With the help of two technical staff members of the cooperating gas company, a larger air-tight gassing chamber was designed and built. It was constructed of heavy sheet steel and was approximately six feet long, two feet wide, and two feet high. Seven pipes in a false bottom were so arranged as to enter the drainage hole of each of seven, seven-inch pots containing the growing trees (Figs. 4 & 5). The lid of the chamber was made of two telescoping parts with large enough holes to take care of the tree trunks and with special watering holes that could be sealed during the gassing period.

On January 1, 1957, seven dormant trees averaging five feet in height (three Norway maples, two London planes, and two pin oaks) were placed in the gassing chamber located at the rear of my home in New York City. They were set in such a way that the pots in which they were growing were completely sealed inside the chamber, only the trunks and branches extending into the atmosphere. A special compound, "Duxseal," was used around the base of each trunk contiguous to the lid of the gassing chamber. The gas line was connected directly to my house service so that a constant supply of gas was available. The gas was turned on late in the afternoon of January 1 and the flow into the chamber so regulated that the escaping air at the other end of the gas chamber could be heard. A long rubber hose was placed at the exit so that the surplus gas could escape into the atmosphere about eight feet from the gas chamber.

The gas was allowed to run over the dormant roots until February 16, 1957, just two days short of seven weeks. The trees were watered three times during this period.

The concentration of gas inside the box was measured at periodic intervals with a Davis Gas Tester by inserting a tube into the chamber through one of the watering holes, and by sampling the gas at the exit tube which released the surplus gas into the atmosphere. After the first full day of exposure, the Davis Gas Tester showed one hundred percent gas inside the chamber and at the exit tube.

The seven gassed trees, as well as three control trees (one of each species) which had been kept nearby with no gas treatment, were brought to my greenhouse on February 16, placed on benches, and watered.

All gassed trees and the controls developed normal leaves. This indicated

Table 1

Substances Comprising Natural and Manufactured Gas

Substance	*Natural* %	*Manufactured* %
Unsaturated hydrocarbons— ethylene, acetylene, benzene, butylene, propylene	None	8.0
Carbon monoxide	None	33.0
Cyanogen compounds and hydrocyanic acid	None	5.0
Hydrogen	.0	33.0
Carbon dioxide	1.0	1.5
Oxygen	0.4	1.0
Nitrogen	0.6	6.0
Saturated hydrocarbons— methane, ethane, propane, etc.	98.0	12.5

that dormant shade trees subjected to natural gas for nearly seven weeks were not harmed.

A second series using four-year-old dormant Norway maples, pin oaks, and London planes was set up on February 28, 1957. The gas was turned on March 1 and allowed to run continuously until April 14. Control trees of the same species were placed near the gas chamber but were not subjected to gas.

As with the earlier trees, this lot developed normally when brought to the greenhouse in mid-April.

On May 1, 1957, another series using trees in full leaf was started. The trees were placed in the gas chamber and their roots bathed constantly for six weeks with natural gas. Control trees in full leaf and of the same age were kept in pots nearby. Water was applied as needed. During that period one of the seven trees in the gas chamber died, as did two of the ungassed control trees. These were assumed to have died from transplanting shock, inasmuch as their roots had been drastically cut to fit the trees into the pots.

Still another series was started using three Norway maples, two pin oaks, and two London planes on June 16, 1957. These were subjected to constant gas for five weeks, during which the gas concentration in the chamber varied from sixty to one hundred percent, as shown by the Davis Gas Tester. All these trees, and the ungassed controls, continued to grow normally for the remainder of 1957 and 1958.

Tests with Manufactured Gas

During 1957 and running concurrently with the natural gas tests, we subjected dormant Norway maple trees as well as trees in full leaf to a simulated manufactured gas prepared by the Matheson Company. The gas had the following percentage composition: methane 75.0; ethylene 11.0; hydrogen 6.0; nitrogen 6.0; and carbon dioxide 2.0. These tests were conducted in the smaller gas chamber used in the first tests.

Most of the dormant trees exposed to this mixture for six weeks failed to leaf out and soon died. Control trees of the same age grew normally. Norway maple trees in full leaf, subjected to this mixture, wilted and died in one week to ten days. Control Norway maples in full leaf continued to grow normally.

Effect of Mercaptan — Natural Gas Mixture

A final series of tests was run to determine whether the odorant mercaptan, commonly added to natural gas, might be toxic to trees.

In September, 1958, the roots of young (two- to six-year old) potted Norway maples, London planes, and pin oaks were subjected to a constant flow of natural gas in the large chamber for four weeks. Included in this gas was mercaptan in concentrations as high as forty times the amount normally introduced into natural gas used by consumers.

Chemists from the cooperating gas company helped by designing special apparatus for releasing the odorant into the natural gas, and by periodically checking on the amounts introduced.

During the course of these tests, the air was sampled from time to time at the exit hole of the gas chamber with a Davis Gas Tester. This machine showed that, after the first day's run, the gas content in the chamber ranged from eighty to one hundred percent.

The trees subjected to a combination of natural gas and mercaptan showed no ill effects. (Fig. 6). They looked as good as or better than control trees of the same age not exposed to any of these materials.

As soon as the trees were removed from the gassing chamber, the soil in which they had been growing was sown

Fig. 7. This healthy Norway maple was photographed on Staten Island in early August 1959, two years after an eight-year-old natural gas leak near it had been repaired. (Reproduced from colored negative.)

with rye grass. The soil around untreated trees also was sown with the same kind of seed. The rye grass developed normally in both lots. These results indicated that no toxic residues remained in the soil that was constantly bathed for four weeks in a mixture of natural gas and mercaptan.

All of our tests conducted from July, 1956, through September, 1958, indicated definitely that natural gas is not toxic to shade trees, tomatoes, or rye grass. One need only compare a typical analysis of natural gas with one of manufactured gas to see why this is so (Table 1).[3]

This table shows that natural gas does not contain any unsaturated hydrocarbons, hydrogen cyanide, or carbon monoxide, which are present in manufactured gas and all of which are known to be toxic to vegetation.

One might argue that the experimental trees used in the major part of the present work were not exposed for a long enough time. I felt that exposing the roots of young trees in leaf to a steady flow of natural gas for six weeks was a sufficiently long period, inasmuch as the same kinds of trees are permanently injured by manufactured gas within a week to ten days.

Moreover, there is photographic evidence of a Norway maple tree and a privet hedge whose roots were bathed with natural gas for nearly eight years and were still perfectly normal. This situation was discovered quite by accident. The tree, which was growing near a privet hedge, had been selected as a subject for gas exposure. It was about five inches in diameter at breast height, fifteen feet tall, and about fifteen years old. A special gas line was inserted into the soil to allow gas to bathe the root area of the tree. The gas was turned on June 3, 1957, and allowed to run constantly for six weeks. At the start, the rate of flow was about two cubic feet an hour. This was increased to ten cubic feet within a week and to fifteen cubic feet nine days later.

Bar-hole readings were taken daily throughout the six-week period from eight different areas. After the first week, all holes indicated presence of gas, ranging from thirty-two to ninety-six percent. The Norway maple continued to grow normally, despite six weeks of constant gas flow over its roots.

After the gas was turned off in mid-July of 1957, bar-hole tests continued to indicate high concentrations of gas in the soil. It was soon found that a gas leak existed in one of the mains near the test plot. When the main was uncovered, it was apparent that a poor welding job about eight years earlier was responsible. There was no doubt that gas had been leaking around the tree and the privet hedge all that time.

The Norway maple and the privet hedge were still in excellent health when photographed (Fig. 7) in August, 1959, two years after the eight-year leak had been repaired.

During the period of this investigation, I had an opportunity to examine more than three hundred large dead or dying shade trees alleged to have been killed by escaping natural gas. My investigation revealed that other agents, particularly fungi, were responsible for the death of the trees.

3. Adapted from "Tree Maintenance" by P. P. Pirone. Oxford University Press, New York, 1959.

DAY OF RECKONING (from page 24)

very little was done to rectify conditions and, to the best of this writer's knowledge, Bernard Slavin was the first city arborist actually to do something about the worsening situation. His noteworthy accomplishment in the selection and use of well-suited street trees is evident today on many Rochester streets, where maintenance costs, power line conflicts, and lighting interference have been reduced to a minimum; in these plantings small trees, fastigiate and columnar forms, have proved their worth in coping with the limiting factors present on so many city streets, and maintenance costs are but a fraction of that required by outsize trees. Outstanding among the improved forms, used so successfully in Slavin's early test plantings, are *Acer platanoides erectum, Tilia americana fastigiata,* and *Ulmus americana ascendens* (his own introductions), and the columnar sugar maple. For smaller species types he selected *Sorbus alnifolia, Tilia cordata, Ostrya virginiana,* and flowering trees of the genera *Magnolia, Malus,* and *Halesia.*

About twenty years ago, when Slavin's excellent street plantings were called to his attention, E. H. Scanlon, who for many years had been preaching "the proper tree for the proper place" and decrying current street-planting practices, was one of the first arborists to appreciate fully the practical advantages so well demonstrated in Slavin's work. While city forester in Cleveland, Ohio, Scanlon embraced the opportunity to do some outstanding work with better trees, but was limited and handicapped by the fact that most of the desirable species and forms, suited for use in well-designed street-tree programs, were not available in the trade. A man who does more than talk about unsatisfactory conditions, Scanlon soon started his "Tailored Tree Nursery". Now many smaller, better adapted trees are available for general use by city foresters and private planters.

It is most gratifying to Slavin, Scanlon, Wyman, Pirone, Lewis, the writer, and others who have spent time and effort forwarding the good work, to note the rapidly increasing trend toward use of more suitable trees and the number of nurserymen growing them. This has been a long, difficult and often discouraging task, but these well-known authorities are responsible for today's renaissance in city-street planting. They have enabled city planners to formulate and administer practical, comprehensive street-tree programs, consistent with the development of modern residential areas, and have also made possible a wider choice of trees, both functional and ornamental, for more satisfactory service on the home grounds.

FRENCH PLANT BREEDERS (from page 3)

breeding plants good, bright, and easy to grow, we shall encourage and facilitate the making of gardens, big and small, and maybe we alone are to have the means of bringing men, or at least a certain number of them, to the realization that mechanical civilization is not enough to satisfy the desire of the soul. We may help man to keep or to find again the contact with nature that is akin to his own nature. We have to be conscious of the fact that our mission is noble and important, and that is how we shall be able to maintain the great traditions that we have inherited from horticulturists all over the world.

BOOK REVIEWS

FLOWERING CRABAPPLES. Arie den Boer. 226 pages, illustrated, indexed. American Association of Nurserymen, Washington, D. C. 1959. $4.95.

Admirers of Arie den Boer and his work with crabapples are happy that his book, undertaken as a labor of love over a period of many years, has finally been published.

Mr. den Boer writes about his favorite trees in a way to make any gardener want to grow them. He describes their great variety of form, foliage, flower and fruit, and gives advice on their planting and care. The descriptions are supplemented with line drawings of leaves, flowers and fruits. The information is presented simply enough for the beginner, and completely and scientifically for the advanced gardener.

Many cultivar names have been revised to conform to the new nomenclature code. This reviewer regrets the resulting mixture of Latin and English in such monstrous names as Aldenhamensis Crab, Charlottae Crab, Eleyi Crab, Hoopesii Crab and Nieuwlandiana Crab. If this practice is widely followed, it will nullify the efforts of nearly fifty years to simplify plant names so that the ordinary human being can understand them. It is hoped that the horticulturists will continue to call them Aldenham, Charlotte, Eley, Hoopes and Nieuwland and refuse to follow blindly the worshippers of sacred priority. American horticulturists should make it clear to the present rule makers that they want and intend to use simple common sense names rather than unspellable and unpronounceable ones.

Peculiarly enough, but presumably in accordance with the present elaborate rules, the book uses the good English names of Arnold, Madgeburg, Parkman, Sargent and Scheidecker in place of their Latin equivalents. It has also made exceptions to the rule of retaining original names, such as shortening to Dittmann the longer but rather pleasant sounding name of Frau Luise Dittmann, thus taking away the compliment intended to the lady. If exceptions can be made in such cases, it is strange they cannot also be made to such names as Aldenhamensis.

In addition to line drawings, the book has four beautiful color photographs which, more than any words, show the value of crabapples for our gardens. Everyone who has room for any flowering trees should own and study this book.

JOHN C. WISTER, *Director*
Arthur Hoyt Scott Horticultural Foundation
Swarthmore, Pennsylvania

THE GARDENS IN THE ROYAL PARK AT WINDSOR. Lanning Roper. 128 pages, illustrated, indexed. Doubleday & Company, Inc., New York. 1959. $10.00.

Among the truly great gardens of the world are the plantings at Windsor Great Park, and it is with astonishment that one learns from this superb book how very recently, in the 1930's they were instituted. The terrain is enormous; the background of ancient trees and water and the happy irregularity of the ground are unparalleled. So was the genius of Sir Eric Savill, the inspired landscape gardener.

The gardens are indeed catholic. They include vast areas of rhododendrons, azaleas, magnolias and many other shrubs, spring bulbs, primulas, lilies, camellias and rare herbs and vines of all kinds that will grow in that climate.

They are open to the public, and the effort has been, not to make a collection for itself, but to plant for the pleasure of the eye of man. The effort has been brilliantly successful as the forty-five colored plates and the fifty-five monochrome plates so generously show.

Even those who garden on a lesser scale will plant their own grounds more wisely as to color and form and association of plants after reading the eloquent text. The philosophy at Windsor has been not so much a garden here and there, however lovely, with "space" between, but the entire landscape has been treated as a worthy and unified field for display.

FANNY W. PARSONS
Harrison, N.Y.

GARDENS OF JAPAN. Tetsuro Yoshida. 187 pages, illustrated, indexed. Translated from German by Marcus G. Sims. Frederick A. Praeger, Inc., New York. 1957. $12.50.

European and American gardens differ in idea and plan from Japanese gardens, generally being more or less geometric in design and usually polychrome. In contrast, the Japanese garden is monochrome and always a landscape garden. The numerous species of flowers to be found in Japan are all grown outside the garden proper.

A further quality, now emphasized in American gardens, is the close connection between house and garden. In Japan, this intimacy of house and garden goes back to ancient times. Although all Japanese gardens are landscape gardens, they are in greatly reduced scale; they copy Nature symbolically rather than faithfully.

Spiritual considerations also have a part in Japanese gardens; Zen Buddhism influenced their development (as did the tea ceremony). They are places of quiet and reflection, and this intention is based on a religious and philosophical demand.

The text gives the general development, history, and types of gardens in Japan, and there are some one hundred and fifty illustrations, 117 of which are full page halftones, and four are in full color. There are numerous sketches.

A selected bibliography and name index conclude this beautiful book, a treasure to be added to one's library. Included and illustrated in detail are the following aspects of Japanese gardens: lakeside, waterfall and bridge; stepping-stones and garden path; stone water basin and stone lantern; tea-house and garden arbor; garden plants and trees; garden fences.

LOUIS BUHLE
Brooklyn Botanic Garden
Brooklyn, New York

A CALIFORNIA FLORA. Philip A. Munz. 1681 pages, illustrated, indexed. University of California Press, California. 1959. $11.50

The eagerly awaited new flora of California has appeared much sooner than might have been expected, only about a dozen years after word was received that it was in preparation. The original plan was that it be done by P. A. Munz, D. D. Keck, and J. T. Howell. The pressure of other duties made it necessary for Mr. Howell to restrict his contribution to *Carex* (by far the largest genus in the California flora, with 144 species) and to consultation in some other groups. Dr. Keck found time to do *Rumex*, *Poa*, and well over half of the Compositae—about ten percent of the total flora, plus the sequence of families, the glossary, the biographical data and abbreviations for authors' names, and much of the editing and proofreading. Except for a few groups that were farmed out to other botanists (notably *Astragalus* and *Oxytropis* to R. C. Barneby, and Cyperaceae except *Carex* to Verne Grant), the remainder of the flora is the work of Dr. Munz, who continues to display the energy, drive and perseverance for which he has long been noted. Under these circumstances, it is perhaps understandable, though regrettable, that at the last moment it was decided to list Dr. Keck as collaborator instead of co-author, since library cards and the back cover of the book will not now carry his name along with that of Dr. Munz.

The greatest difficulty in floristic study is that if one takes time to work out all the problems he encounters he will never get a flora written. Dr. Munz seems to have achieved a satisfactory compromise between the conflicting pressures. He has, of course, made use of existing monographs, and even of the still unpublished manuscript for the fourth volume of Abrams' Illustrated Flora of the Pacific States, but he has evidently borrowed with discrimination, and one is surprised at the amount of independent study he has managed to give groups on which there is no recent authoritative treatment.

As one who is interested in the general system of plants, I am gratified to see that the names Spermatophyta, Gymnospermae, and Pteridophyta have been abandoned by the authors, with five divisions of vascular plants being recognized (for California) instead. It is unfortunate that the sequence of angiosperm families, which is evidently based on Besseyan principles and intended to reflect modern knowledge and thought, is not further explained. Some of the intent is obvious, such as in the placement of the *Empetraceae* directly after the *Ericaceae*, but it is difficult to discern the broader outlines of the system from the linear sequence.

In size, format, and paper, the new flora is much like the current (8th) edition of Gray's Manual, with indented keys and moderately full descriptions. One species (seldom more) in each family is illustrated. The richness of the California flora is shown by the fact that the book treats nearly as many species about (five thousand) as Gray's Manual, in an area less than one fourth as large.

The Munz and Keck flora will immediately become the standard flora of California, and should remain so for several decades.

ARTHUR CRONQUIST

FOREST FIRE CONTROL AND USE. Kenneth P. Davis. 573 pages, illustrated, indexed. McGraw-Hill Book Co., Inc., New York. 1959. $12.00.

This book by Professor Davis and his collaborators presents a complete description of forest fire control in the United States, the basic factors affecting fires and measures for controlling them. Published as an addition to the growing list of works in "The American Forestry Series," it will undoubtedly be accepted as the standard text in its field.

Part One deals with effects and behavior, kinds of forest fires and the influence of forest fires on forest types. Such things as the effect of fire on trees, on forest microclimate, on vegetation and soil are explained. Forest fuels and their combustion with a description of the fire triangle, fuel-

(Continued on page 35)

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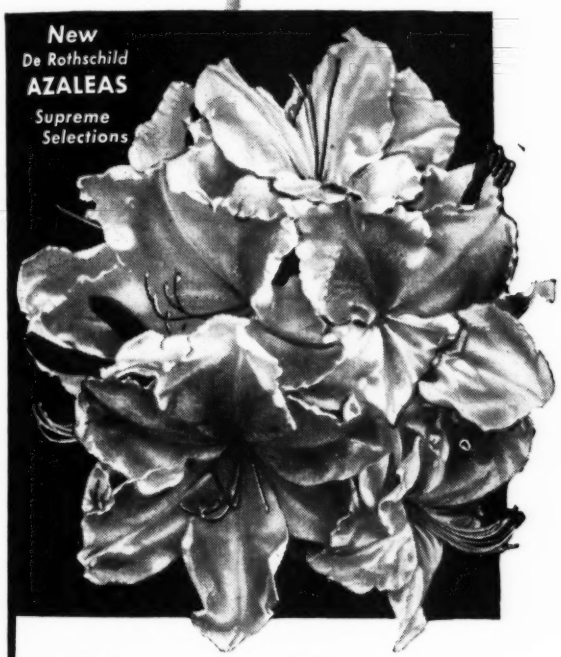

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New ALTHEA, *Blue Bird* brings sky-blue beauty to your borders with magnificent single blossoms that measure a full 5 inches in diameter. They have a clarity of color never seen in any other Althea. Plant in sun, sit back, and watch Blue Bird flourish.

New ABELIOPHYLLUM, *Distichum,* called white forsythia, is a most beautiful conversation plant. Palest pink when buds open, this 3½ foot, sun-worshiping shrub soon turns into the most welcome snow-white Spring flower-drift you've ever seen.

New VIBURNUM, *Pink Beauty* is a pink Tomentosum that surpasses all other shrubs for delicate and bountiful beauty. Flowers open white and gradually turn to clear, sunset pink. Amazingly, it prefers only the simplest of care.

New MALUS *Red Jade.* A two-season beauty that originated in New York's famous Brooklyn Botanic Gardens. In Spring, this softly weeping tree is a flower-fall of white; in Autumn, the fruit ripens to striking scarlet, a marvelous display.

New ROBINIA, *Friesia* makes a bright three-season showing as patio or lawn tree. Spring brings pale yellow leaf buds that open to rich gold plumes, slowly turning copper as Fall approaches. Thorns gleam red; the shoots, orange—unforgettable color fantasy.

NEW
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Starfire

The NEWEST *and hardiest* PERENNIALS

New DICENTRA, *Bountiful* is a non-stop bloomer. From bud-break in Spring through mid-summer, it produces masses of fuchsia-red flowers that are almost double the size of the common Plumy Bleeding Heart. Early Fall to frost, blossoms again cover its handsome dark green foliage.

New GENTIANA, *Makinoi,* makes a lovely spot of color in late Summer and early Fall gardens. A deep Gentian-blue, celebrated in song and story, new Oriental-import *Makinoi* grows about 12 inches tall and has been proven exceptionally hardy by Wayside testing.

HOSTA, *Thomas Hogg.* An unusually handsome border plant. Large, glossy leaves of richest green are dramatically edged in silver. In early Fall, its lovely lavender flowers are a charming accent.

New PHLOX, Symons-Jeune Hybrids, created in England, bring to your Phlox collection extreme hardiness, exquisite clarity and variety of color plus extraordinary abundance of blooms shading from white to brilliant orange-scarlet and deep salmon-pink.

New PHLOX, *Starfire,* a sure-fire hit in any man's garden, brings you right into the collector's class among phlox-men. *Starfire* is the only true-red Phlox. Rare as a true-blue friend and as easily cultivated as the most casual of acquaintances.

New SEDUM, *Indian Chief* provides a gorgeous spot of color in your Fall border. All during the Spring and Summer it offers an oasis of cool, gray-green foliage; then in cooler weather, it tops itself with red-copper blooms that would be stunning against a background of Wayside Chrysanthemums.

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Wayside Gardens

NEWS, NOTES and COMMENTS

Contributions to the New Library Wing. In the brief time that the drive for funds for the proposed library wing has been under way, over $100,000 has been subscribed. This excellent beginning is largely due to the initiative and devoted attention on the part of Mrs. Hermann G. Place, Vice-President of The New York Botanical Garden and Chairman of the Building Committee, who is spearheading the campaign. Contributions have been made by members of the Board of Managers, members of the Advisory Council, and other members of the Garden. The Advisory Council is contributing to the office of the Director in the proposed wing.

Several members of the Garden have sent in pledges in addition to their original contributions.

Dr. William C. Steere, Director of The New York Botanical Garden, has said, "There is no question that we can look forward to the marvelous reality of a new library wing in the not too distant future."

Membership. Another six hundred members have been added to The New York Botanical Garden from many areas in the United States and from as far as the Bahamas and Brazil.

Mrs. Eileen Kene, Membership Secretary, will send literature and an invitation to join The New York Botanical Garden to any relative or friend of a member of the Garden, whose name and address are furnished.

Educational Program. According to T. H. Everett, Assistant Director (Horticulture) and Curator of Education, the Educational Program at The New York Botanical Garden is going well this year, largely through the fine teaching by members of the staff. 1,021 registered for courses in the fall term. The winter term starts on January 4, 1960 with the course in Systematic Botany II. The course in Flower and Vegetable Gardening begins on January 7, and the course in Planning the Home Grounds on January 19.

National Science Foundation Grants to the Garden. The New York Botanical Garden has been awarded $23,500 by the National Science Foundation for the support of basic research entitled, "American Lauraceae: Taxonomy and Geographical Distribution," under the direction of Dr. Caroline K. Allen, Visiting Research Associate. The grant, which became effective October 1, 1959, will be three years in duration.

The Garden has been awarded a grant of $4,750 by the National Science Foundation for the support of basic research entitled, "Pilot Study of Application of Electronic Data Processing Devices to Systematic and Economic Botany," under the direction of Dr. David J. Rogers, Curator of Economic Botany, and Sidney W. Gould, of Madison, Connecticut. The grant, four months in duration, became effective October 16, 1959.

Dr. William C. Steere, Director, addressed the Council of the U. S. National Arboretum in Washington, D.C., in October on The New York Botanical Garden. The Council was interested in learning about the Garden, as the two institutions have many similar problems.

Dr. Steere, during the past several months, attended a luncheon of The Nutrition Foundation at the Waldorf-Astoria, New York City; meetings of the Committee of Biological Editors of the American Institute of Biological Sciences, of the Advisory Committee on Institutional Grants of the American Cancer Society, of the Steering Committee of Biological Sciences Curriculum Study, and of the American Association for the Advancement of Science. He also gave his presidential address to the American Society of Plant Taxonomists.

Dr. Steere Contributes to Two Books. In Nielsen's book on UNIVERSITY ADMINISTRATION IN PRACTICE, Dr. Steere brings his experience as Dean of the Graduate Division of Stanford University to bear on the financing of basic research. He discusses, among other things, the part played by the university in encouraging research, and the sources of grants to support it.

In READING FOR LIFE, Dr. Steere discusses the reading habits of college students, especially of those scientifically inclined, American anti-intellectualism, the problem of communication between scientist and layman, the introduction of the student to a library, the teaching of science, and, in general, the importance of reading to all students, in science as well as the humanities.

Staff Activities. T. H. Everett, Assistant Director (Horticulture) and Curator of Education, and Louis P. Politi, Horticulturist, who visited the Montreal Botanical Garden this past fall, were impressed with its magnificent plant collections. From a plantsman's point of view, they comprise in variety, quality and number of plants the finest in North and South America. There are fine new greenhouses and conservatories, some still under construction, others not completely planted.

Dr. Clark T. Rogerson, Curator of Cryptogamic Botany, participated in the annual foray of The New York State Mycological Society. Two rainy days were followed by three clear days, so there were a number of fungi for collection in the area visited in the Adirondacks. Participants came from Great Britain, Switzerland, Ottawa, Saskatchewan, and Kentucky as well as local points.

Dr. David J. Rogers, Curator of Economic Botany, attended a meeting of the officers and Council of The Society for Economic Botany in Washington, D.C. According to the agreement between the Society and The New York Botanical Garden, Dr. Rogers is now managing editor, and Dr. Bernice Schubert has been appointed technical editor, effective February 1, 1960. Dr. Richard M. Klein, Alfred H. Caspary Curator, has been named the Society's treasurer.

Dr. H. W. Rickett, Acting Assistant Director (Botany) and Bibliographer, has revised the bibliographies to standard form on all the papers presented at the Fourth International Congress on Plant Growth Substances in preparation for the book to be published by Iowa State College in May 1960. Dr. Klein is Chairman of the Editorial Committee responsible for the book.

Dr. P. P. Pirone, Plant Pathologist, was the speaker at the staff seminar in November—his subject, "The Response of Shade Trees to Natural Gas." Dr. Pirone has completed the revision of Dodge and Rickett's DISEASES AND PESTS OF ORNAMENTALS. The revised book, bearing the same title, by Pirone, Dodge and Rickett will be published in spring 1960 by Ronald Press Co., New York.

Dr. Arthur Cronquist, Curator, has been added to the list of instructors in the Department of Botany at Columbia University from the Garden.

Stephen S. Tillett completed the requirements for his doctorate at Claremont College in California during October. Dr. Tillett, Research Associate, is working on the tropical program under Dr. Bassett Maguire, Head Curator and Coordinator of Tropical Research. Dr. Maguire, who has been on an expedition in northern South America since August, is expected to return to the Garden in January. His itinerary has included Colombia, Bolivia, Peru and Brazil.

Lubbert Westra, a graduate assistant from the University of Utrecht, arrived in October to be an assistant in the herbarium until July 1961, when he will return to Utrecht to complete his doctorate. Mr. Westra will accompany Dr. John J. Wurdack, Associate Curator, on his next plant collecting expedition to northern South America. They plan to leave in January 1960.

Dr. Elsa O'Donnell, a student of Dr. Oscar Kühnemann in the Department of Botany, Faculty of Exact and Natural Sciences, University of Buenos Aires, Argentina, has been appointed a visiting investigator in the Research Laboratory. Dr. Irma Gamundi-Amos, another student of Dr. Kühnemann, has been using the facilities of the laboratory and herbarium.

Arthur M. Anderson resigned as a member of the Board of Managers of The New York Botanical Garden on October 29, 1959, having been a member of the Board since January 1933. Mr. Anderson served as treasurer of the Garden from 1938 to 1952, and has been a member of the Corporation since 1933.

Visitors to the Garden. Within recent months, the following have visited The New York Botanical Garden:

Dr. Agathe L. van Beverwijk, Director of Centraalbureau voor Schimmelcultures, Baarn, The Netherlands.

Dr. John D. Bu'Lock, University of Manchester, England.

Dr. Ivan M. Johnston, Arnold Arboretum, Harvard University, Cambridge, Mass.

Dr. Richard A. Howard, Director, Arnold Arboretum, Harvard University, Cambridge, Mass.

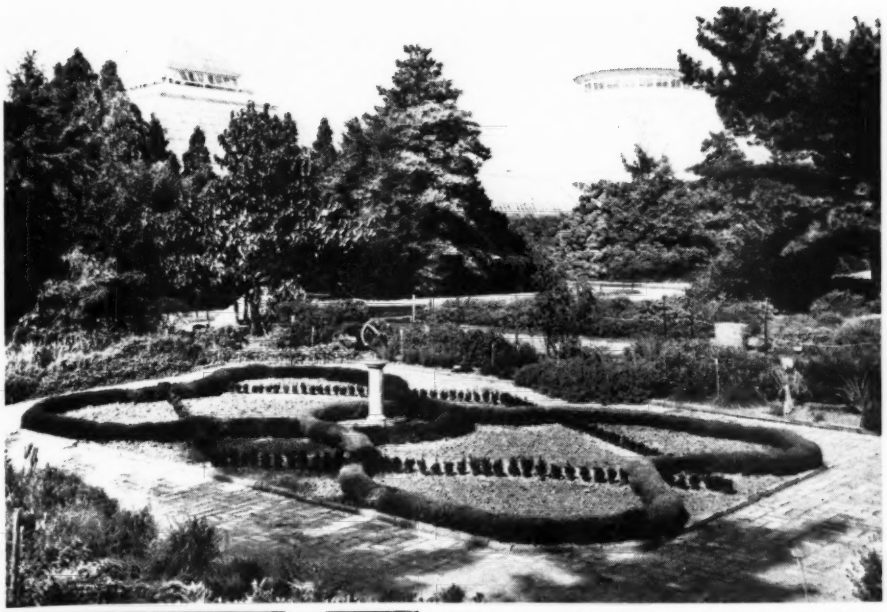
Dr. Donald Wyman, Horticulturist, Arnold Arboretum, Jamaica Plain, Mass.

Dr. Russell J. Seibert, Director of Longwood Gardens, who addressed a staff seminar on Longwood Gardens.

Gustav F. Herbst, Rye, N. Y., who presented the Library with a collection of seed catalogs of the latter part of the nineteenth century, on behalf of Captain Frank Jaeger, Rockport, Me.

R. T. Koenig, Research Librarian, Fritzsche Bros., New York, N. Y.

Dr. Benjamin Blackburn, Drew University, Madison, N. J.



Members of the New York Unit of the Herb Society of America participated in Open Garden Day, October 14, 1959, at The New York Botanical Garden as hostesses in the Herb Garden and in the adjacent Study Collection of Herbs. The Herb Garden was recently replanted and the Study Collection added, with the cooperation of the New York Unit.

Left. Mrs. Charles Colton Lawrence, Chairman for the Day on October 14, 1959, and Mrs. A. Sumner Gambee, Chairman of the New York Unit.

Dr. Robert K. Zuck, Drew University, Madison, N. J.

Dr. H. J. Scoggan, National Museum of Canada, Ottawa, Ontario.

Dr. Raymond Weibel, Conservatoire et Jardin Botanique, Geneva, Switzerland.

Dr. Warren H. Wagner, Jr., University of Michigan, Ann Arbor, Mich.

Dr. David D. Keck, National Science Foundation, Washington, D.C.

Dr. Richard S. Cowan, U. S. National Museum, Washington, D.C.

Dr. Wladyslaw Szafer, Polish Academy of Sciences, Krakow, Poland.

Dr. Tobias Lasser, Instituto de Botánico, Caracas, Venezuela.

Dr. R. D. Hoogland, Commonwealth Scientific and Industrial Research Organization, Canberra, Australia.

Mr. and Mrs. Roy Arthur Hunt, Pittsburgh, Pa.

Dr. Frits P. Jonker, Botanical Institute, University of Utrecht.

Recipients of degree of Docteur ès-Science from the University of Montreal, August 21, 1959. Left to right: Dr. Stanley A. Cain, Head of the Department of Conservation, University of Michigan; Dr. C. G. G. J. van Steenis, Director of the Flora Malesiana Foundation, Leiden; Dr. William C. Steere, Director of The New York Botanical Garden; Monseigneur Irenée Lussier, Rector, Université de Montréal; Dr. Pierre Chouard, Head, Laboratoire de Physiologié Végétale de la Sorbonne, Paris; Dr. Eric Hultén, Director of the Botanical Department, Naturhistoriska Riksmuseum, Stockholm.

A New Species of Justicia Named in Honor of George R. Cooley. Through the support of George R. Cooley, it has been possible to prepare for the herbarium of The New York Botanical Garden a large collection of southeastern United States plants collected by John K. Small and co-workers twenty-five to forty or more years ago. This has lain in storage until now.

Even without systematic study, several interesting specimens have been discovered in this rich material, the most outstanding being a new species of *Justicia* from Florida which has been named *J. cooleyi* by Joseph Monachino of The New York Botanical Garden and Emery C. Leonard of the Smithsonian Institute. *J. cooleyi* was published and illustrated in the July 1959 issue of RHODORA.

Upon being advised of the new species, Mr. Cooley collected copious fresh material from the type locality at Indian Hill and subsequently discovered it growing at Chinsegut itself near the colonial mansion where he resided. An article on Chinsegut Hill appeared in THE GARDEN JOURNAL of The New York Botanical Garden for September 1958.

George R. Cooley was an investment broker until his retirement five years ago. He is now devoting his unflinching efforts on a long-time botanical project which will ultimately culminate in the printing of an up-to-date manual of the southeastern flora.

JOSEPH MONACHINO

'Chanseonette,' a camellia sasanqua seedling, is the first to receive the Ralph Peer Sasanqua Cup. 'Chansonette' was developed by Miss Marjorie Wishburne of Port Arthur, Texas, and the original plant is now eight years old. It is being propagated for release in fall 1960, by Eagleson Nursery, Port Arthur, and Neccio's Nursery, Altadena, California.

The Ralph Peer Sasanqua Cup is made available for the best sasanqua seedling in any one year by Ralph S. Peer, past president of the America Camellia Society.

New Varieties of Fruit. A new peach, 'Collins,' named in recognition of many years of service to peach growers by the late Lester Collins, Moorestown, New Jersey, is described by Dr. H. W. Martin, Director of the Station, "as the earliest-ripening, yellow-fleshed peach ever introduced by the New Jersey Agricultural Experiment Station." The tree was bred by Dr. L. Frederic Hough and Dr. Catharine H. Bailey of the Department of Horticulture.

Three new strawberries, 'Fletcher,' 'Frontenac,' and 'Fulton,' developed by Dr. George L. Slate of the New York State Agricultural Experiment Station, Cornell University, have been on trial at the Station for several years. Limited stock is now available for more extensive testing by commercial and home fruit growers.

Wayside Gardens 1960 Introductions. Among the new, or little-known, plants which Wayside Gardens, Mentor, Ohio, are introducing this year is clematis 'Mrs. P. T. James,' which freely produces large, double, blue flowers on well-established plants. It is reported that the first year this clematis is planted, it will bear both single and double flowers; but thereafter blooms are fully double.

Wayside's rose offerings include 'My Choice,' which was awarded the Clay Challenge Cup for the best scented British rose of 1958 and the National Rose Society medal. It has a strong damask fragrance. The bud, which is yellow splashed with vermillion, opens to reveal petals lemon-yellow outside, carmine within. The colors

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pale as the flower opens fully to a soft silvery pink with the old world yellow of the tea rose on the reverse of the petals.

Three of their spiraeas include *S. arcuata*, from the Himalaya Mountains, which seldom grows more than three or four feet high and blooms profusely. The pure white flowers in June and July are followed by conspicuous mahogany-red seed clusters. This is a shrub for small gardens, as it does not have to be sheared so often in order to keep it a desirable size. Another spiraea for small gardens is *S. arguta compacta;* its neat habit of growth and height of three feet are characteristics which recommend it as a hedge plant. The third member is *S. sanssouciana*, which was developed by the German botanist, B. Koch. This is a little taller than the other two, as it may reach five feet in height at maturity. It is hardy, will grow in any reasonably good soil, has attractive blue-green foliage, and in June and early July upright panicles, twelve inches long, of a rosy hue.

Readers of THE GARDEN JOURNAL who may be thinking of acquiring a greenhouse so that they can have the pleasure of growing plants the year round, will find answers to some of their questions on design, size, location, foundation, heating, in a booklet YOUR NEW GREENHOUSE. It may be had on request from Lord and Burnham, Irvington on Hudson, New York.

Europe—1960 is a springtime tour scheduled to leave New York April 18 via the S. S. Rotterdam of Holland-America Line (April 25 via KLM Airlines) with T. H. Everett, Assistant Director (Horticulture) of The New York Botanical Garden, conducting the tour to Holland, Belgium, Switzerland, Italy and France.

Among the points of interest to be visited are "Floriade," the International Horticultural Exhibition at Rotterdam and the tulip fields in Amsterdam; also the "Floralies," the famous flower show at Ghent, and the botanical gardens and King's gardens in Brussels. Information on Europe—1960 may be obtained from Transmarine Tours, Inc., New York.

Sogetsu Floral Art, Inc., is the official counterpart of one of the foremost schools of Ikebana, creative flower arrangement and allied arts in Tokyo—the Sogetsu Ryu School, directed and founded by Sofu Teshigahara.

Teshigahara's American teaching representatives in the United States is Madame Kazuko Ogura. Mme. Ogura, who holds seven diplomas in the art, has taught advanced flower arrangements for twenty years and has exhibited arrangements and her sculpture abroad. She has also been called upon to create special arrangements for the Emperor and the Crown Prince on occasions of imperial significance. Miss Teruko Hatazawa assists Mme. Ogura in teaching.

The Sogetsu School in Tokyo, designed by Kenzo Tange, was awarded the Grand Prix at the 1958 International Architectural Concourse in Paris.

Dr. Philip A. Munz, Director of the Rancho Santa Ana Botanic Garden and Professor of botany at Claremont Graduate School, who recently returned from six months abroad, reports that many plants, native to California, are cultivated in Europe. This was particularly interesting to Dr. Munz, who collaborated with Dr. David D. Keck on A CALIFORNIA FLORA. Dr. Keck, who was formerly assistant director and head curator of The New York Botanical Garden, is now Program Director for the Biological Sciences, National Science Foundation.

Dr. Munz made the trip to Europe under the auspices of the National Science Foundation, from which he was the recipient in 1957 of a $10,000 grant for research on the evening primrose family. While in Madrid, where he had gone because of the collection of evening-primrose genera in the herbarium, Dr. Munz studied and identified specimens of plants brought from Mexico in the 1800's.

Dr. William Stern, Curator of the Samuel James Record Memorial Collection, School of Forestry, Yale University, gave an illustrated talk on his expedition to the Province of Darien, Panama, before the Torrey Botanical Club at the meeting held at The New York Botanical Garden on November 3, 1959. Dr. Steere's talk will be published in a forthcoming issue of THE GARDEN JOURNAL under the title, "Plant Collecting in the Land of Balboa." At the November 17, 1959, meeting held at Columbia University, Dr. William Jacobs of Princeton University lectured on "What Makes Leaves Fall."

Dr. G. S. Puri, M.Sc.Hon., Ph.D. (Luck.), Ph.D. (London) has been appointed Director of the Central Botanical Laboratory, Allahabad, succeeding Dr. E. K. Janaki Ammal, who was the first director and has just retired.

The Laboratory has four divisions—ecology, physiology, cyto-genetics and economic botany. Its main function is to study the different aspects of plants' relationship with their environment with a view to clarifying the systematic position. The emphasis is laid on plants of economic importance.

Dr. Puri has had a varied experience through his twenty-five years of botanical career. He has gained international fame in palaeobotany, phyto-geography and ecology and has enjoyed the privilege of working with Prof. Birbal Sahni at Lucknow and Prof. W. Pearsall at London. He was forest ecologist at the Forest Research Institute, Dehra Dun, for about two years, and during the last three years, as regional botanist of the Western Circle of the Botanical Survey of India, completed a reconnaissance survey of the vegetation of western India. Dr. Puri has published about two hundred botanical papers and two major books, INDIAN MANUAL OF ECOLOGY and FOREST ECOLOGY.

Citations at the American Horticultural Congress, Rochester, New York, October 7-10, 1959, were presented to Thomas P. Reilly, Dansville, New York, as announced in the November-December issue of THE GARDEN JOURNAL; to Eugene S. Boerner, Newark, New York, for hybridizing chrysanthemums, delphiniums and other plants, and especially for originating roses for greenhouse and garden culture; to Henry J. Kohankie, Painesville, Ohio, for a lifetime devoted to the propagation and production of high-quality plant material and

to making such material available to the gardens of America, and for elevating the standards of nursery practice and business ethics; to Fred F. Rockwell, Orleans, Massachusetts, for a lifetime devoted to gardening and horticultural journalism, and for promoting through writing, lecturing and photographing an interest in plants and many types of garden practice; and to John Nash Ott, Winnetka, Illinois, for time-lapse photographic techniques and for utilizing this skill in popularizing gardening and in broadening the knowledge of gardeners and plant scientists in aspects of plant life not easily observed.

The American Horticultural Council also awarded the F. A. Bartlett medal for outstanding contribution towards the appreciation and care of ornamental trees to Bernard H. Slavin. Mr. Slavin started as a laborer in the Rochester, New York, park system in 1890 at the age of eighteen; was foreman of Highland Park 1895-1903, of Seneca Park 1903-1911; assistant superintendent 1911-1928; and superintendent of parks 1928 until his retirement on May 1, 1942, at the age of seventy. This was the first time this medal, made possible as an A.H.C. award through the generosity of F. A. Bartlett, Stamford, Connecticut, and designed by Edmond Amateis, Brewster, New York, was presented.

The Liberty Hyde Bailey medal was awarded to Benjamin Yoe Morrison, Pass Christian, Mississippi, who was for many years principal horticulturist in the division of plant exploration and introduction, Bureau of Plant Industry, U.S.D.A., first director of the U. S. National Arboretum, and editor of THE NATIONAL HORTICULTURAL MAGAZINE, and has made valuable contributions to ornamental horticulture through his work with azaleas, rhododendrons, narcissi and other plants.

One of the important actions of the Fourteenth Annual American Horticultural Congress was the approval by the members, in plenary session, of the merger between the American Horticultural Council and the American Horticultural Society, which is expected to become effective early in 1960. Officers of the Council elected to serve during the interim are: Dr. Richard P. White, Executive Vice-President of the American Association of Nurserymen, as President; Carl Fenninger, John J. Tyler Arboretum, as First Vice-President; William H. Frederick, Jr., Hockessin, Del., as the Second Vice-President; Dr. Donald Wyman, Horticulturist of the Arnold Arboretum, as Secretary-Treasurer. New Members of the Executive Committee are Mrs. Jesse F. Hakes, Jerome A. Eaton and Charles D. Webster of the Horticultural Society of New York, Harold Epstein of the American Rock Garden Society, Dr. William E. Snyder of Rutgers University, and Mrs. Dorothy Ebel Hansell, Editor of THE GARDEN JOURNAL. Mrs. Hansell represented The New York Botanical Garden at the Congress.

BOOK REVIEWS (from page 30)

water relationships, mechanisms of fire propagation and the early life history of a fire is covered. The differences between large and small fires, the blow-up fire, interpretation of fire behavior warning signals and the future of fire behavior sirens is well presented. Fire weather is described in detail with temperature, air moisture and atmospheric conditions, pressure systems, winds, thunderstorms and special conditions that encourage fire spread. The fire danger rating system and how it is used is explained.

Part Two covers the control of forest fires. It deals with the prevention of man-caused fires; fire causes and occurrence; hazard reduction, detection, fire suppression methods and tactics; control line building, and a description of mechanized equipment used. The use of chemicals, water and air-tankers are mentioned. The building and operating of the fire control organization and the need of training personnel for large fires is emphasized. A case history of large fires is presented.

Part Three covers the objectives in fire control, the use of fire in forest land management especially as a silvicultural tool, and the development and status of forest fire control in the United States. The term "backfiring" described on page 317 seems to be used interchangeably with the terms "line firing" and "burning out." A glossary of words and terms peculiar to forest fire control would be a desirable addition.

While it is understood that the work is intended to apply primarily to the United States, it would seem as though some mention of the development of air tankers by the Ontario Department of Lands and Forests in 1957 would have contributed measurably to an understanding of this technique.

CLARENCE A. PETTY
New York State Conservation Department

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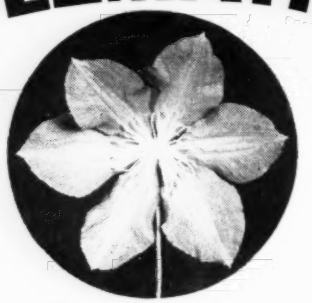

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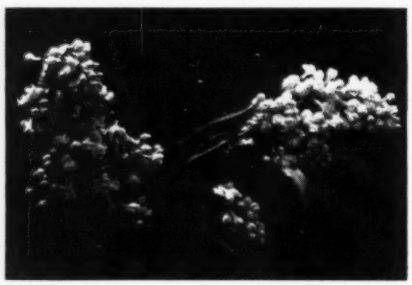

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THE NATIONAL FORESTS. Carhart, Arthur H. 289 pages, illustrated, indexed. Alfred A. Knopf, New York. 1959. $4.75.

Conservationist Arthur Carhart presents a guided tour of our forest heritage, the National Forests. First, he tells the history of forest conservation and the establishment of our National Forest system primarily to protect watersheds and grow wood but also for livestock grazing, recreation, and wildlife.

Then he takes us into the ten administrative regions of the United States Forest Service, one by one, stressing their main features. In various National Forests he describes the geology and history, mountains and scenery, meanings of names, kinds of trees, game and other wildlife, and special products. Throughout he emphasizes conservation, particularly the protection provided by the forest cover against erosion and floods. The "tin-roof" watershed theory is severely criticized, and misuse of watersheds is illustrated by overgrazing and excessive erosion.

Much factual reference material has been accurately presented in narrative form with personal experiences and anecdotes for pleasant reading. Statistics are scattered inconspicuously.

Suggestions about where to go on forest outings and vacations are numerous. The Appendix lists the National Forests and regional headquarters with addresses, where readers may obtain additional information.

Twenty-four pages of Forest Service photographs illustrate activities on our National Forests. A larger, more detailed map of the United States showing names and locations of National Forests would be a useful addition to future printings.

The legend that Oregon-myrtle is found only in southwestern Oregon and the Holy Land is repeated. As confirmed by the tree's other name, California-laurel, the second place means California!

ELBERT L. LITTLE, JR.
United States Forest Service
Washington, D. C.

INDUSTRIAL MICROBIOLOGY. Samuel C. Prescott and Cecil G. Dunn. 3rd ed., 945 pages, illustrated and indexed. McGraw-Hill Book Co., New York, 1959. $17.50.

Microbiological transformations of steroids make possible the production of many of the pharmaceutically active steroids now prescribed so extensively. Without the highly specific actions of microorganisms, the number of steroids used in medicine would be fewer and they would be more expensive. Production of several amino acids has been developed, especially by Japanese workers, to provide a cheap source of nutritionally important amino acids. These are but two examples of the many economically important industrial microbiological processes.

The third edition is a revision by C. G. Dunn of the second edition to include the open literature which appeared in the period from 1947 to 1956 as judged by the literature citations. Old chapters were reduced in size or were dropped to make room for the new material so that the revision gave a book with only twenty-two pages more than the previous edition. Chapters omitted were: "Textile Microbiology," "The Microbiology of Wood," and the two appendixes. The new chapters reflect the areas of interest that developed in the decade between the two editions. They are: "Vitamin Production by Yeasts and Yeast-like Microorganisms," "Dextrans," "Production of Vitamin B_{12}," "Gibberellic Acid and the Gibberellins," "Ustilagic Acid," "Production of Mushroom Mycelium by the Submerged-Culture Process," "The Production of Amino Acids by Microorganisms," "The Microbiological Transformations of Steroids," and "Some Biochemical Engineering Aspects of Fermentation." Thus, the second supplements the third edition in some parts and should not be discarded. The field of industrial microbiology is so large that no single volume can serve as more than an introduction to it and as a guide to the literature of specific topics. In certain industrially important areas, for example, the production of vitamin B_{12}, riboflavin, steroids, and antibiotics, the book is quite inadequate through no fault of the authors; the pertinent information has not been published and probably will not be. Many of the yield figures given in the book are at least an order of magnitude lower than current industrial accomplishment.

The five pages devoted to the assay of penicillin gives the reader a poor idea of the difficulty and complexity of microbiological assays. The most used chemical method for assay of penicillin, the hydroxamic acid method, is not given in the list of chemical methods.

F. KAVANAGH
Indianapolis, Ind.

THE ORCHIDS. Carl L. Withner (ed. by). 648 pages, illustrated, indexed. Ronald Press Company, New York. 1959. $14.00.

THE ORCHIDS—A Scientific Survey, edited by Carl L. Withner, is a book that will live!

Here is the product of a specialist who has digested the orchid literature which has gone before, and has sifted out the vital and useful information required for a basic knowledge of all that has to do with orchids.

The author has marshalled the knowledge of the best technicians on specific subjects of orchids and by-lined these articles for valuable reference. The chapter "Key to the Orchids," can take a bow!—twenty-five pages anyone can understand. The sixty pages of line drawings, some with fifteen subjects, make identification of various genera and species exhibited in orchid shows by new orchidists an enjoyable, simplified chore!

Withner's own chapter on orchid physiology saves the reader endless research, as does "Hybridization and Inheritance of Orchids."

Today, chromosome counting in the orchid field is as popular as the cross-word puzzle and just as tantalizing, so Withner presents sixty pages to feed the chromosome-hungry fans.

The breeding enthusiasts are not forgotten and well-known formulas of culture media and nutrient solutions are at fingertip reach.

Between the covers of this work is bound the kind of essential research you, yourself, may often have wished might be done.

RODNEY WILCOX JONES
New Rochelle, N.Y.

OLD ROSES FOR MODERN GARDENS. Richard Thomson. 154 pages, illustrated. D. Van Nostrand Company, Princeton, N. J. 1959. $7.50.

With his beautifully illustrated lectures, this enthusiast must have persuaded many to collect "the old roses." Now his experiences with them in his garden near Philadelphia are reflected in the first American book on the subject since those of Mrs.

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Keays and Francis Lester. Much research and rediscovery have gone on since their time, inclusion of which gives this text special value for the amateur.

Introductions to the chapters beneath each main group—"Old European Roses," "Old Oriental Roses," and "The Species," where he lists those not included before—add further details to the summary of rose history, all of which are fascinating to the rose addict. For each chapter there is a recommended list, based on those grown by the author. The numerous illustrations are notable—many of the color photographs were taken by him in his garden, all refreshingly honest portraits.

This is a handsome gift book which fills a useful place between Roy Shepherd's important rose history and Graham Thomas's THE OLD SHRUB ROSES, which, while more authoritative and also more charming, is based on the much longer lists available in England and (It has been published in America.) R. C. Allen forgets such men as these in his introduction. You will have to turn either to Thomas or old Bunyard for clear instructions as to soil and pruning.

To consider species, species-hybrids, hybrid perpetuals and all other hybrids up to 1900 as "old roses" extends this field beyond the range of the older writers. A text tying them all into their places in history enlarges the viewpoint of the amateur, and should increase interest in hybridizing.

Those who already grow these enchanting flowers will, of course, find points of difference and omission of their own favorite, but few will have grown as many as Mr. Thomson, or even have seen them in nurseries.

MRS. EDWIN DET. BECHTEL,
Mount Kisco, N. Y.

HANGING FLOWER AND PLANT DECORATIONS. Zelda Wyatt Schulke. 125 pages, illustrated, indexed. Hearthside Press, Inc., New York, 1958, $3.95.

This book is devoted to hanging arrangements—in pots, baskets, and swags, and to decorations in the form of wreaths, wall plaques, collages, pendants, mobiles, for outdoor as well as indoor living. The reader is urged to make use of versatility, whimsy, and gaiety as well as dignity in depicting original compositions for appropriate hanging decorations.

In emphasizing the fun and beauty of hanging plants and flowers the author points up the hospitable look they give, creating the feeling that nothing has been spared in making the guest's arrival an occasion.

In preliminary research the author learned that very little had been written on the subject. With this in mind, she presents 122 black-and-white photographs of hanging arrangements made by designers throughout the country, including some of her own, to reveal the extensive field such decorations cover. The illustrations include many types of hanging arrangements for use in a wide variety of places.

Each plate is described in detail. The type of container, the names of plants, fruits, vegetables or other natural material that constitute the design, are listed. In each photograph the author calls attention to the material employed to carry out the basic line of the container or of the design.

Mention is made of the importance of repeating the colors of the container or its surroundings in the material selected for the arrangement. Attention is called to the subtle use of contrasts in color and texture as well as to the development of pleasing space relationship. The author names the mediums used to achieve the most pleasing effects. For example, lighting is considered a powerful element of design.

Ideas are given the collector to enlarge the variety and selection of material at hand for his creations. However, the point is stressed that the most ordinary objects may be considered appropriate in the hands of an imaginative designer.

Formulas for the treatment of materials to bring about the desired effects, usually kept secret, are disclosed; so also are sources of material including gadgets, descriptions of construction techniques such as how to hide the mechanics employed in forming the decoration.

For the organization whose goal is a workshop production of a large variety of hanging decorations for sale at the next fair or flower show or house and gardens tour, this book offers a host of ideas. For them, as well as individuals interested in a stimulating, creative art, this book will be invaluable.

MRS. MARCUS FAIR
Tenafly, N. J.

YOUR LAWN—HOW TO MAKE IT AND KEEP IT. R. Milton Carleton. 165 pages, illustrated, indexed. D. Van Nostrand Company, Inc., Princeton, New Jersey. 1959. $3.95

Lawn troubles have been legion over most of the eastern portion of this country in 1959. Many troubled home owners will likely be attracted to this book in the hope it will prescribe the remedy for their lawn troubles. While this book contains some information of value, it is hardly a guaranteed manual for lawn success.

It is obvious the author has had but limited experience with golf course man-

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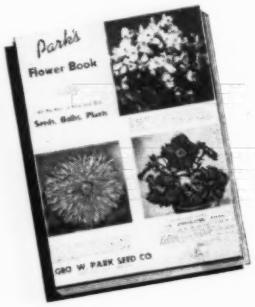

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agement methods. While this reviewer shares Mr. Carleton's enthusiasm for Merion Kentucky Bluegrass, it is not used on golf greens in the Chicago district (page 117) or elsewhere. It has been used with varying success on golf tees. Few agronomists will subscribe to his opinion of the shade tolerance of Merion Kentucky Bluegrass.

The section on lawn building and seed selection is quite well done. The chapter on lawn renovation—the renewal of deteriorated lawns—is skipped over superficially with little reference to proven methods and modern equipment to accomplish the objective. Lawn grass diseases, which are rarely serious on home lawns, are overemphasized. Insects, especially chinch bugs and sod web worms, responsible for much loss of turf in the East this year, get but scant attention. Fine turf agronomists will find much in this book to which they will take exception. Just another book on lawns, easy to read, with but little up-to-date information promised in the foreword.

WARREN E. LAFKIN
White Plains, N. Y.

GARDEN IN YOUR HOUSE. Ernesta Drinker Ballard. 256 pages, illustrated, indexed. Harper & Bros., New York. 1958. $5.95.

Perhaps some of the readers of this journal saw Mrs. Ernesta Drinker Ballard's educational exhibit in the 1959 Philadelphia Flower Show called "House Plants on Vacation." In this exhibit it was presumed the owner was leaving the house unattended for two weeks, and it showed the careful preparations taken to make sure the plants would not suffer. Lace curtains were drawn, thermostat set at 55°, and all the plants but succulents and Bromeliads were imbedded in moss. The African violets were moved onto a table with a miniature plastic greenhouse with controlled heating.

The exhibit illustrated a very careful study of every possible angle, and you will find her book GARDEN IN YOUR HOUSE a very thorough one as well. In the first part it gives general information about culture, and being very up-to-date mentions "Perlite," "Saran Wrap," plastic boxes, and electric heating cables. In part two are illustrations of indoor gardens of all types, mostly from her home with extensive text.

Part three, the most extensive of the book, gives a selection of plants in alphabetic order, with useful tips on the growing of the plants. Special emphasis is given to Mrs. Ballard's favorites.

The last part of the book is called a "Finding List"—finding plants for different exposures and temperatures, finding the right mixture for Bromeliads, African violets, and others, finding books on and suppliers of house plants.

Mrs. Ballard has no sympathy with people who grow plants for the sake of decor only, so anybody who feels that way may become annoyed with her book. She devotes most of her life to her plants and expects the reader to do likewise.

My criticism does not lie in the text of the book but in the poor photographs which do not show the plants to best advantage.

C. BOUTARD
Berkshire Garden Center
Stockbridge, Mass.

SUBCELLULAR PARTICLES. Teru Hayashi, (Ed. by). 213 pages, illustrated, indexed. The Ronald Press Co., New York. 1959. $6.00.

This volume, addressed to "all those who consider themselves students of the cell," has two stated purposes: first, to summarize recent work on the isolation and characterization of subcellular particles, and, second, to correlate at least some of the functional knowledge thus gained with information about the structure of these particles. The papers comprise the 1958 Symposium of the Society of General Physiologists. Recent parallel progress both in cytology, especially in the techniques of electron microscopy and cytochemistry, and in the biochemical investigation of subcellular units isolated from homogenized tissue has enabled biologists to make important discoveries concerning the localization of chemical processes in specific cell organelles and to gain significant insight into other aspects of the relationship between cell structure and function.

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The first three papers deal, respectively, with techniques used to approach the problems, enzyme reactions at surfaces, and structural factors in polymerization. The remainder take up questions of structure and function in mitochondria, the endoplasmic reticulum, Golgi membranes bacterial photosynthetic chromatophores, lysosomes, nuclei, nucleoli, and chromosomes.

The contributors are eminently qualified to discuss their subjects with authority, and the symposium constitutes a valuable collection of reports on recent important advances in cellular physiology.

VIRGINIA C. LITTAU
Rockefeller Institute

THE ACTINOMYCETES. Volume I. Selman A. Waksman. 327 pages, illustrated, indexed. The Williams & Wilkins Co., Baltimore 2, Maryland. 1959. $12.50.

The present book, the first of three volumes, is concerned with the occurrence, nature, and activities of the actinomycetes. The two volumes that follow will deal, respectively, with the taxonomy of the actinomycetes and with their use in the production of antibiotics.

Volume One can stand alone as the most comprehensive treatment of the actinomycetes yet published. A partial list of subjects discussed includes the following: the isolation and cultivation of the actinomycetes; the classification, structure, and life cycles of these organisms; their nutrition and metabolic activities involving the production

of enzymes, vitamins, pigments, and antibiotic substances; and their role in animal and plant diseases.

The author, Dr. Selman A. Waksman, is well qualified to write of the actinomycetes, having studied them in their many aspects for almost fifty years.

The book is printed by the Waverly Press on high quality paper, on which the many excellent photographs are beautifully reproduced.

ALMA W. BARKSDALE

HOW TO KNOW THE MOSSES AND LIVERWORTS. Henry S. Conard. 226 pages, illustrated. Wm. C. Brown Company, Dubuque, Iowa. 1959. $2.50 wire coil binding; $3.00 cloth binding.

This revised edition of "pictured keys for determining many of the North American mosses and liverworts, with suggestions and aid for their study," has been greatly enlarged. It is an excellent handbook prepared for beginners by an authority in this field. Its purpose is to simplify identification of the more common mosses and liverworts through the use of a very workable key with illustrations of the most distinctive characteristics of each of the species. Any serious beginner with a good handlens or a microscope will find this book an indispensable aid in learning to recognize these plants. It is particularly useful when used with the larger manuals and floras.

M. FULFORD
Cincinnati, Ohio

DIE FLORA DER SARMATISCHEN STUFE IN UNGARN. Gabriel Andreanszky. 428 pages, illustrated, indexed. Printed in German. Hungarian Academy of Sciences, Budapest, Hungary. 1959.

The value of this appealingly presented book lies in drawings of almost every species, and in numerous plates permitting the critical investigator to judge specific validity. Considering the limited boundaries of Hungary, a commendable effort is made to evaluate, chart and compare individual floras of the Sarmatian (upper Miocene) horizon, and thus present a unit-guide for central European palaeobotanists.

Unfortunately the author frequently indulges in the already long frowned-upon procedure to determine specifically incomplete specimens, naming fragments that lack tip, base, or margin. In addition, many specimens of a clearly size-variational nature, especially in the *Betulaceae* and the *Fagaceae* are specifically separated. This procedure has resulted in approximately two hundred and forty species, one third of which are "new species" named by the author.

As a correlative work for New World species the volume is of little value. Many of the newly described forms obviously exist in our own Tertiary record, a fact which is vaguely acknowledged by the author in his postscript (Nachwort). Thus the book is, as the title implies, of value only within the boundaries and immediate vicinity of Hungary. A lack of reference to Asiatic, Arctic, and American continental floras detracts considerably from a potential, international interest in this work.

The extensive bibliography is devoid of American or Asiatic references, and it appears deplorable that all collaborators and critics are Hungarians, that none of the neighbouring eminent French or German palaeobotanists were consulted. In America, to use a vernacular expression, "one simply wouldn't get away with it."

HERMAN F. BECKER

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LETTERS TO THE EDITOR

In my article, "Plants of the Bible, A Stamp Collection," I stated that I knew of no stamps picturing frankincense or myrrh. Since then Somalia in east Africa, south of the Holy Land, has issued a series of stamps honoring its incense trade. Two of these picture an actual incense tree, *Boswellia carteri,* one of three species from which frankincense is obtained. They and a third stamp, showing the burning of incense, have been added to my collection in mint form.

I should also mention that the stamp portraying apricots, the biblical "apples of gold," is Hungarian rather than Jugoslavian. I noticed the mistake only very recently.

It is quite natural, I suppose, for anyone who gets into print to look forward to possible replies to an article. They indicate interest. The first response to this particular article came promptly. It was from a classmate of mine in the two-year botany course at the Garden. Then came a postcard from Hawaii. I had met the sender on one of The New York Botanical Garden tours, and we had exchanged addresses. She was on her way to Japan.

A most interesting communication came from the Editor of THE ASPLUNDH TREE, a quarterly published for the employees of the Asplundh Companies, tree experts. It began with a cheery "Good Morning!", then described my article as "certainly interesting!" Enclosed were three of this editor's own articles. One was on "Philatelic Trees," another on "Trees in the Bible," and the third on "State Trees of the United States."

The response that surprised me most was the letter from Hungary which you forwarded, all covered as it was with beautiful Hungarian stamps, and enclosing a few. I had no idea THE GARDEN JOURNAL had so widespread a circulation. Perhaps a few quotations from the letter will interest you. "I red your article in the July-August number of THE GARDEN JOURNAL of this year about 'Plants of the Bible.' It was really very interesting . . . . I am a gardener from profession and I am collecting plant and flower stamps, and air mail stamps. Really you have done a most scientific work not only a simple stamp collection. I thought I will try and wright you wheather you need any Hungarian flower stamps." Her offer of Hungarian stamps delighted me. It is relatively easy for me to obtain particular unused stamps of any of the recent issues, but I like, whenever possible, to get used stamps as well, and that I do not find so easy. There is a kind of "romance of use" that appeals to me. I hope she will be able to satisfy that desire to some degree.

Each day's mail, as it is pushed through the door slot, holds a potential thrill. Maybe, just maybe, there will be a letter bearing stamps of Africa, Asia, Australia, any place.

ELISE LUDLAM BOWLES
Yonkers, New York

I am a fern hobbyist and grow many of the ferns you mention. I read your article with interest. It was most informative, especially about sterilization and planting spores. Now please tell me where I might obtain either living plants or spores of the following . . . . . .

DR. W. C. DRUMMOND
Los Angeles, California

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TO

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A special insert in the May-June 1960 issue will describe the bulbs from Holland, for fall 1960 planting, that will be offered only to members of The New York Botanical Garden. An order blank and shipping label will be included in the insert.

The 1960 Bulb Offer to members of the Garden will be presented only through the pages of the May-June 1960 issue of The Garden Journal.

OUR POLICY ON ADVERTISING

We believe a body of "where-to-buy" information in the advertising section of THE GARDEN JOURNAL is a distinct advantage to you, our readers. For this reason we are making an effort to convince a selected group of advertisers that THE GARDEN JOURNAL is carefully read by a devoted group of gardeners . . . gardeners who read and respond to their advertising.

As an official publication of The New York Botanical Garden, we are very sensitive to our responsibility to you. For this reason we have placed two restrictions on the acceptance of advertising in THE GARDEN JOURNAL:

1. Subject matter must be limited to seeds, bulbs, plants, fertilizers and chemicals, tools, and gardening books — items that are pertinent to the editorial material:

2. Claims by advertisers must be reasonable and substantiated.

We shall continue to do our best to insist that the advertising in THE GARDEN JOURNAL's columns conform to these restrictions, and therefore we believe our readers can buy from our advertisers with utmost confidence.

When doing business with them, please mention THE GARDEN JOURNAL.

LETTERS TO THE EDITOR (from page 39)

THE GARDEN JOURNAL has long been one of the most important and interesting publications that I receive. The contents seem always to be pleasantly varied and certainly well illustrated. In the November-December 1959 issue the article about "David Fairchild's Friends" was especially interesting to me, since I lived for two years in Coral Gables, Florida, and spent many days in the Fairchild Tropical Gardens learning about tropical flora.

A picture of David Fairchild and Alex Hawkes was printed with the article by Dr. William J. Robbins . . . . Perhaps the readers of THE GARDEN JOURNAL are not familiar with the wonderful work Mr. Hawkes is doing in the field of botany. Three years ago, I met him in Coconut Grove, Florida, where he lives and raises many rare tropical plants, especially orchids, bromeliads, and aroids.

I obtained several orchid plants from Alex Hawkes which, along with the native Florida orchids I had collected in the Everglades, started my orchid collection. Now my interest in orchids is such that the many plants I have are flowing over into our living-room windows from the greenhouse. Mr. Hawkes was encouraging, patient, and helpful so I believe that a good portion of the interest I now have for these plants is due to his influence.

Mr. Hawkes is the editor of several useful publications about orchids, palms, tropical ornamentals, and bromeliads. THE ORCHID WEEKLY, which began publication in May, 1958, has proved to be the most-up-to-date source of orchid culture, history and collecting information that I've ever come across. Mr. Hawkes, in all of the papers he prints, is very precise about everything—from cultural directions to the very latest botanical nomenclature.

Since my plant hobbies now include most tropicals, especially epiphytic and semi-epiphytic plants, I have been receiving for six months THE BROMELIAD PAPERS. In this publication, Mr. Hawkes does his usual best. From his own collection of bromeliads, he has gained a wealth of knowledge which he passes on to his fortunate readers.

THE ORCHID JOURNAL, an international review of orchidology in magazine form, is also under Mr. Hawkes' editorship. This magazine is very well illustrated and contains valuable information for the orchid fancier. The "botanical" orchids seem to be a special love of Alex's, and these charming plants are often featured in THE ORCHID JOURNAL.

Mr. Hawkes is also a lecturer. Although I have never heard one of his talks, I'm sure that they must be fascinating if his writing is any indication of his verbal skill. The very fact that Mr. Hawkes has collected rare orchids and bromeliads in many central South American countries would make his plant-talk interesting.

The latest thing Alex has planned is a trip which he will conduct to Peru, Chile, Argentina, Brazil and Trinidad under the American Express Travel Service "Second Annual Jungle and Gardens Tour" plan. This thirty-day trip will start on January 19, 1960. I believe Mr. Hawkes makes at least one trip a year into the South American jungles; perhaps some of THE GARDEN JOURNAL readers might be interested in going on the next one.

I am concerned with letting other New York Botanical Garden members learn about the publications Mr. Hawkes edits, because in my experience they have been extremely useful. The address of THE ORCHID WEEKLY, THE BROMELIAD PAPERS and THE ORCHID JOURNAL is P.O. Box 435, Coconut Grove, Florida. I believe that Mr. Hawkes would send any New York Botanical Garden member a sample copy of THE ORCHID WEEKLY, if he were interested in learning more about orchids.

Let me again say how much I enjoy your fine publication, THE GARDEN JOURNAL. Please continue the wonderful work!

CHARLES MARDEN FITCH
Mamaroneck, N.Y.

The foreword to Paul Vossberg's article "On Dexter Hybrids" in the November-December issue of THE GARDEN JOURNAL is O.K.—but it doesn't tell the story fully enough.

First the Committee (Dr. Clement G. Bowers, Dr. Henry T. Skinner, Dr. Donald Wyman, Mr. Vossberg and I) visited The New York Botanical Garden on May 24, 1950; looked over the plants that had been purchased from Dexter around May 1940; and labeled sixteen plants, beginning with the plant that we first agreed upon which we numbered One. (It bore the Garden's No. 67)

Vossberg and I returned on June 1. Most of the ones we had numbered were passè, but No. 67 was still top-notch, and we both were thrilled to see how good it still was.

I then went to Dr. Robbins and asked if I could have cuttings. He was most gracious in his immediate and enthusiastic "Yes." The Arthur Hoyt Scott Horticultural Foundation made a bargain with Mr. Vossberg to take the cuttings, grow them, and deliver potted plants in May 1951 — at a set price per plant delivered—Paul to have the right to keep some propagating stock.

Paul delivered about two hundred plants to the Foundation, including nearly all the sixteen New York numbers. Similar selections were made at Sam Everitt's, at Howard Phipp's and in later years at the two Moseley places.

We got about ten plants of No. One (N.Y.B.G. No. 67) which is now called 'Scintillation.' We have five here and two at the Tyler Arboretum, and some repropagations. I do not know how many Paul Vossberg kept, but he did have some good stock plants for cuttings.

Fourth and most important—the Garden was deluged in a flood some four or five years ago. No. 67 was washed away with other plants, and it was thought lost forever. But because Dr. Robbins allowed cuttings to be taken and because the Scott Foundation paid Vossberg to grow them, this valuable clone was not lost to the world, and posterity, which is just around the corner, can have it and enjoy it.

JOHN C. WISTER, *Director*
Arthur Hoyt Scott Horticultural Foundation
Swarthmore, Pa.

Tomorrow [September 19, 1959] we fly to New Delhi, India. We have visited the botanical gardens in Leningrad, Moscow, Sukumi and here [Tashkent, Uzbekiztan, U.S.S.R.] They had been destroyed during the war, but they are endeavoring to restore them—working on the one here for seven years. It has a good section of American trees and shrubs. They said they receive THE GARDEN JOURNAL of The New York Botanical Garden and are impressed with it.

MRS. MAURICE LENZ
Member of the Garden

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